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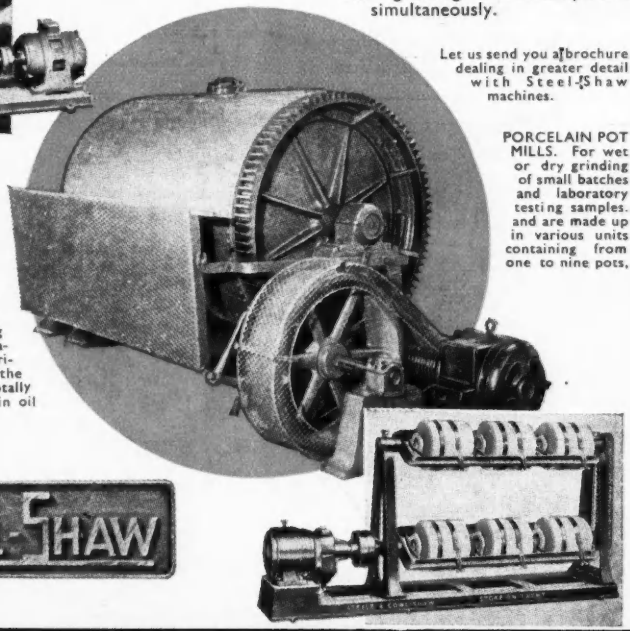

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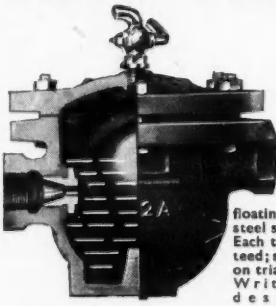

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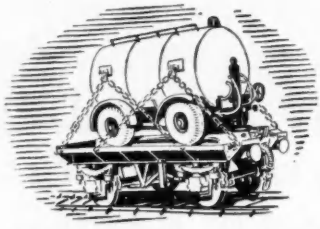

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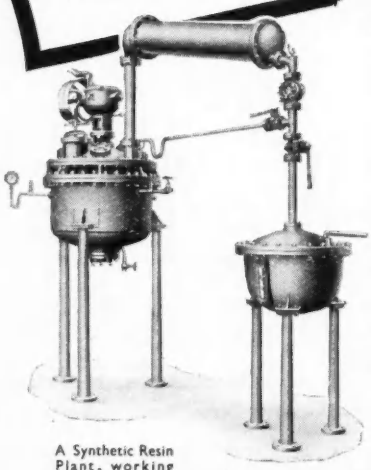

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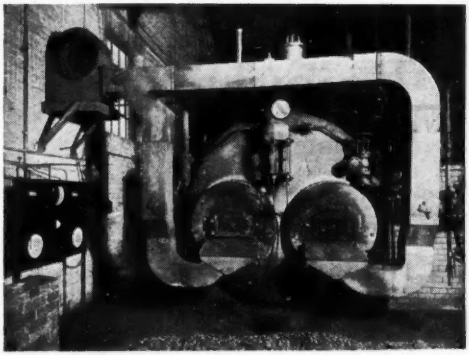

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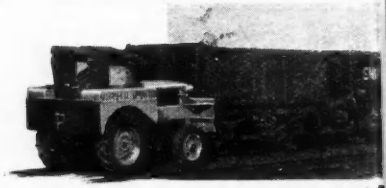

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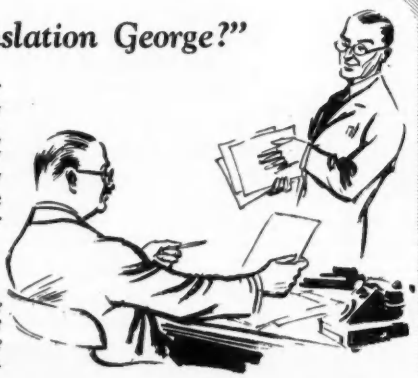

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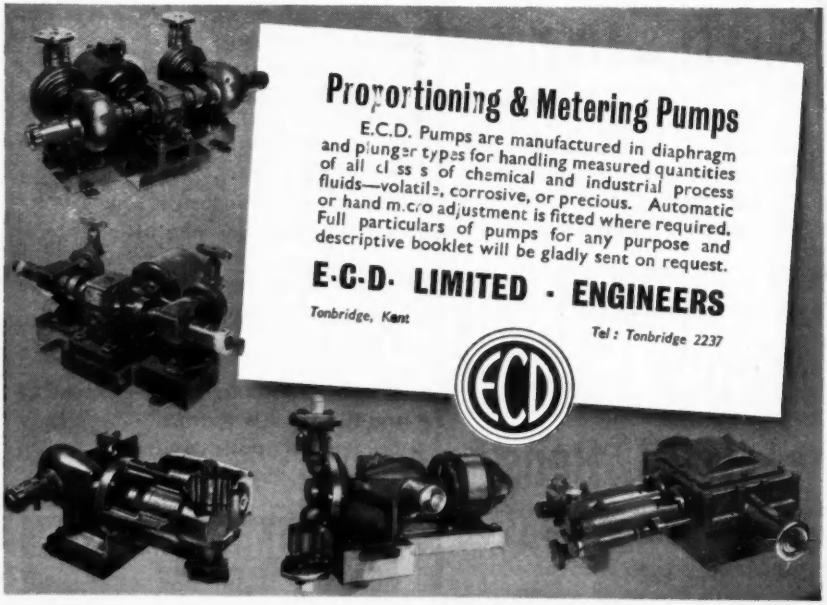
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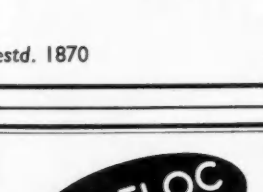

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Scale of German Industry

THE latest chapter in the long drawn-out story of conflicting and changing Allied counsels on the scale of Germany's post-war industries would sound incredible could it be seen from the standpoint which Britain, France and America held in common in 1946 and had not entirely lost in 1947. To appreciate how vastly all three of the custodian nations in Western Germany have changed ground in the passage of little more than two years, it is only necessary to glance back at what was firmly proposed when the Foreign Ministers were accustomed to confer.

Step by step, nearly all these proposals have been scattered to the winds, until, largely in response to American pressure, the prospect was seriously contemplated of permitting, and in fact, promoting, the re-establishment of nearly all the heavy and light industries in Germany, excepting only those designed for war and nothing else. The weakening of Allied resolution, deplorable as it has appeared to some with better memories than the rest, had a disarming array of excuses, of which the benevolent and extremely effective economic campaign by the U.S.A. on Europe's behalf has been among the most compelling. Industrial and economic revival in Western Europe without the stimulus and materials formerly derived from Germany was certainly not impossible, but it could not have been achieved quickly. Meanwhile, the defection, and finally the hostile competition, of Russia and Soviet dominated territory has been a powerful factor in diverting attention from what were once considered to be the minimum requirements to shield the world from the threat of a new war potential in Germany.

That is the background to the "complete agreement," announced in London last week, by which the three Western Powers have laid down supposedly in final form the scale of remaining reparations and of prohibition or restriction of German industry in general. Some element of suspicion that even this may not be the last word in the matter is excusable. For some three months representatives of the three nations have been pressing or rebuffing claims for retention in Germany of 381 plants, of which a large proportion have been concerned with steel and non-ferrous metals, chemicals and scientific instruments. Many are in the British zone and most of them are of intimate interest to the chemical and metal supplies of the rest of Europe. The list included, for example, three former I.G. Farbenindustrie chemical undertakings in the French zone.

The final total of 158 plants to be retained in Germany, while strikingly more liberal than would have been accepted not long since, evidently represents the fruit of forceful representations by two of the Allied nations. Less than four months ago, the Humphrey Committee set up in

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the U.S.A. by the Economic Co-operation Administration was urging that 220 of the 381 "borderline" plants should be authorised to continue operations in Germany and remain there. Some lack of realism in the first proposal is indicated by the fact that among the 220 factories some had already been allocated when the list was compiled. That no doubt materially aided the further pruning of the schedule to 167. The latest withdrawal of nine plants from the number reprieved is stated to be a great deal more important than it sounds. It comprises the three I.G. Farbenindustrie chemical works of which the French have been the guardians, and six steelworks in the British zone. These nine are considered to be worth 30 per cent of the whole value of the 167 provisionally earmarked for preservation, and their value may be regarded as a fairly faithful measure of productive capacity.

One other result of the growing liberality of the view of what is essential for a healthy economy in Germany is, of course, a corresponding reduction of potential for reparations, most of which is in the British occupation zone. From this area alone it was formerly proposed to distribute plant worth 603 million Reichmarks of the 1936 currency value. By the present ruling, which has all the appearance of finality, this sum is scaled down by approximately 10 per cent. To the United Kingdom the dwindling of the reparations pool, which appears as yet to have yielded relatively so little benefit to British industries, gives less occasion for disquiet than the widening of the permitted manufacturing programme. Henceforth, the ban will be lifted to permit the production of precision and optical instruments—of which the latter are already coming from Germany at highly competitive prices—non-ferrous metals and vanadium, heavy and light engineering goods, shipping of restricted speed and tonnage and certain "black-listed" chemicals. In the last category are the synthetic detergents coming from the two Fischer Tropsch plants, whose preservation is intended to continue only until supplies of natural oils and fats are restored.

This brief summary, representing only some of the principal changes to widen German industries, will leave no doubt that considerable intensification of current German competition in some overseas markets must be provided for. Some exceptions remain, ensured by the continued limitation of steel to 11.1 million ingot tons annually, and fairly strict restriction of synthetic ammonia, chlorine, styrene, aluminium and ball and roller bearings. These, however, are not in the categories in which keenly competitive market conditions are likely to prevail in the immediate future.

NOTES AND COMMENTS

Metal Prices

SOMETHING approximating to second sight seems to be required of chemical and chemical plant manufacturing users of non-ferrous metals to determine at what price levels their basic supplies will stand before their Autumn production programmes take shape. Judged by ordinary standards, the prospects would contain unmistakable promise of some degree of relief almost at once from the high rates at which lead, zinc and copper have stood with little change since the war. The delayed action effect produced here by the intervention of the Ministry of Supply between the foreign producer and the British user has prevented the quick reaction which ordinarily would have resulted from the recent clear evidence of decline in values in the U.S.A. of zinc and, this week, of copper and of a further weakening of the lead position. Thus uncertainty and reluctance to place orders are unnaturally prolonged. No such conjecture is called for regarding the other most widely used member of the non-ferrous group—aluminium, for which the new higher prices announced this week are said to represent a justified increase long delayed (*page* 581 *this issue*). The current relationship between output of the main Canadian producers and sustained world demand lends no support to hopes of cheaper aluminium.

A New Widnes ?

THE most convincing example of the benefits of British and American collaboration in industry comes from Monsanto Chemicals, Ltd., and the scope of it is indicated in the building up of new chemical force in the West—at Ruabon and Newport. It would be hard to exaggerate the importance of what is being done at Newport, now that the expansion of the Ruabon chemical production centre is so nearly achieved. The Newport plan has been described with unusual freedom in the " progress report " which Monsanto is presenting to its British stockholders, numbering about 3000, in connection with the annual meeting next month. Among the products which will flow on a very greatly increased scale when the Monmouthshire plant reaches large-scale production this year are synthetic detergents and chemicals for oil, and generally a large proportion of the materials which either have to be imported or are urgently required in larger quantities for export. The direct American contribution to all this derives from the fact that much of this field has been fully explored by Monsanto's U.S. associates, and great savings in research and experimental work are made possible. Bearing in mind that what is being added at Ruabon and Newport will ultimately more than double Monsanto's productive power and that the investment is on a scale represented by £3750 for every worker who will be employed there, the importance of this sort of aid is not likely to be under-estimated. Not the least remarkable of the English company's achievements is the cordial collaboration it has evoked from local authorities in the West and, even more significantly, from the Government departments which wield the final power to sanction or forbid new enterprise.

German Price Cutting

GERMANY'S reviving industries, the subject of a three-Power agreement which promises to have far-reaching effects in the future (*page* 577) are potentially formidable competitors, so that it is sometimes overlooked that they are meanwhile beset with special problems. Sudden changes in German economy and consequently in the country's export policy are liable to occur with little warning. Little has been said, for example, of the existence in Western Germany of nearly 1.5 million unemployed, victims of the money shortage, which is holding in check some industries, preventing the purchase of raw materials and in some cases making impossible the payment of wages bills. With a high bank rate (9 per cent at the beginning of the year), some German manufacturers are evidently hard pressed to finance current operations, in spite of the low labour costs and some other advantages. A correspondent of the National Union of Manufacturers, recently in Germany, writes in the Union's *Journal* of " Stagnation in business and industry and a wave of bankruptcies." Undesirable as all this is from the standpoint of stability in the West, it is said also to be con-

tributing to a price-cutting policy which is having a direct effect on our own manufacturing and commercial prospects. Some German manufacturers, critically short of working capital, are said to be cutting home and export prices 10-12 per cent below normal market levels and, in some cases, below the actual cost of production. None of these things augurs well for full reciprocal exchange, which is one of the planks of OEEC, and the sooner order is restored in German values the better it will be for the industries of the West.

U.S. Library Gifts

WELCOME news of a further scheme which promises to relieve some of the existing shortage in this and other European countries of scientific publications, comes from Cleveland, Ohio. In the place of scarce or non-existent native text-books there may soon be American equivalents, and in some departments of technology the partial substitution should confer new lines of thought. Gifts of U.S. technical and scientific books are to be sent to foreign schools and libraries under a new programme sponsored by CARE, the Co-operative for American Remittances to Europe, which was announced at the second U.S. national conference of the U.N. Educational, Scientific and Cultural Organisation, recently, by Mr. Murray B. Lincoln, president of CARE. This book programme, as stated by him, is a practical way in which the people of the U.S.A. can aid UNESCO's efforts towards educational reconstruction. He promised that the latest and best U.S. books will be selected to meet needs in countries which suffered from the war. Evidencing the likely popular support for this programme, Mr. Lincoln said that the people of the U.S.A. had given CARE $75 million in the past for food and clothing packages, and for the new book scheme the publishing companies had assured CARE of their support and co-operation. The scheme is scheduled to start on May 15, when books are to be sent in block shipments to institutions designated by foreign governments, UNESCO, and other agencies. The categories to be sent overseas include chemistry and chemical engineering, medicine, agricultural science, veterinary science, biology, geology, and physics. Such libraries will soon be offered to this country, Austria, Belgium, Czechoslovakia, Finland, Italy, France, Greece, the Netherlands, Norway, Poland and the British, American and French zones of Germany, Korea, and Japan.

Naming Synthetic Fibres

FOR long the subject of discussion in textile circles throughout the world, the distinctive naming of " man-made " fibres appears now to be likely to take definite form. The terms and definitions committee of the Textile Institute, feeling that the time has come for reconsideration of the position, is now inviting opinions on the subject from all concerned with the production and application of fibres not of natural growth. In the early days of the production of fibres from cellulose, milk, and like materials, the term " artificial silk " was common and degenerated into the even more fanciful " art silk." Silk manufacturers disliked the association of the new materials with their ancient industry, and producers of the new fibres viewed with equal disfavour the implications of inferiority and makeshift inherent in the terms. In 1924 the name " rayon " was adopted in America, and this has since been the officially recognised term in most sections of the textile industry and one which the British Textile Institute and the British Rayon Federation have endorsed in recent years. There have later been signs of a change of outlook in America, where there is a tendency to restrict the use of the word rayon to describe regenerated cellulose fibres. The Textile Institute is to be congratulated on courageously tackling the task of producing order in a field of terminology which has become increasingly confused as the number of synthetic filaments has multiplied.

Rosin, Turpentine and Pine Oil

The Board of Trade announces that rosin, turpentine and pine oil will no longer be purchased on public account and will revert to private trading as from April 25. Imports will be subject to licence, the granting of which will be governed by the observance of certain conditions as to use of the materials. Supplies will be made available by importers and merchants, generally against certificates issued by the appropriate trade association.

ALUMINIUM PRICES RAISED

£3 Per Ton More for Ingots

FOLLOWING the increase in price of virgin aluminium announced by the Ministry of Supply on April 1 last year, prices of unwrought and fabricated aluminium products have been revised, announces the British Aluminium Co., Ltd., The prices of unwrought products have been adjusted to allow for the increase in price of virgin aluminium and for the changes in prices of alloying metals

Most of the changes in the value of fabricated metal represent an increase of 1d. per lb.; BA 60 alloy circles are surcharged with 1½d. per lb. Some sheet and coiled strip remain at the old prices.

The rise in ingot values is approximately £3 per ton. The same increase applies to virgin aluminium hardeners and rolling slabs and wire bars. Secondary alloy ingot, however, remains for the present unchanged. The prices of the bulk of fabricated products, states the B.A.C., have had to be further increased to take into account:—

(a) increases in wages and holiday payments which were only partially allowed for in the current prices;

(b) increases in manufacturing costs due to the higher cost of services and the demand for products with improved properties and standards of finish, particularly in strong alloys; and

(c) substantial increases in costs of plant maintenance and replacement since the war, for which no provision has previously been made.

The new prices for unwrought products apply to all orders accepted on or after April 4 and to any despatches on or after April 14 against orders accepted previously. The new prices for fabricated products, including powder and paste, apply to all orders accepted on or after April 19 and to all despatches on or after May 1 this year.

New Canadian Source of Cobalt Chemicals?

THE possibility that a British cobalt plant may be established in Canada as a result of enterprise by members of a London and Croydon company, in recognition of the widespread shortage of the metal and its derivatives, is held out in a report received this week from New York.

According to this, Mr. F. I. Hibbert, managing director of the New Cross Chemical Co., Ltd., lately leaving New York for Canada, spoke of the possibility that his company would be associated with the creation near the mines and smelter of the Silanco Mining and Refining Company at Cobalt, Ontario, of a plant to produce salts, oxides, powders, chemical solutions and other derivatives of cobalt.

The decision to take the enterprise to Canada, the report states, was influenced by the acute shortage of cobalt in England and the possibility that it may become more acute as the widespread rearmament programme of the Atlantic Pact is implemented. That programme will require considerable tonnage of cobalt for such applications as jet aircraft, turbines, rockets and controlled missiles, tool steel and gun linings, for which the metal is essential because of its high heat-resisting qualities. Cobalt is also widely used for electronic devices.

Use of metallic cobalt for rearmament purposes is liable to create a shortage of cobalt in the unrefined forms used by chemical industry. Salts, oxides and other derivatives of cobalt, are increasingly sought to condition cattle, as essential fertiliser elements to harden glass and varnish, as pigment in the paint and ceramic industries, and in various chemical solutions.

Mr. Hibbert is reported to have contemplated the interrelation of the new plant with the processes of the Silanco smelter. It could be quickly converted, if required, to produce material for rearmament. Silanco will continue to produce metallic cobalt for industry, principally in the U.S.A.

The Silanco smelter, now nearing completion, is said to be the largest of its kind in the western hemisphere and is reported to have a daily capacity for treating 10 tons of concentrates. Cobalt, Ontario, has one of the few major deposits of cobalt, the other principal sources being Rhodesia and the Belgian Congo.

Canadian Magnesium Fabricating.—Dominion Magnesium is reported to have completed the construction of its new magnesium fabricating plant at Haley, Ontario. Erected at a cost of approximately $500,000, this unit includes a large extrusion press, the first of its kind in the country, to make shapes, tubes, angles and various other items.

Rising Production Levels in January

Stock Position Generally Firmer

STOCKS of most basic chemicals in January showed a general increase over the same month last year but were slightly lower than in December. While basic production was steady, with increases in compound fertilisers and pig iron and steel ingots and castings, consumption in most cases was slightly reduced, according to the last issue of the *Monthly Digest of Statistics* (No. 29, March, 1949).

Employment figures are given in a new series based on the number of contributors under the National Insurance and National Insurance (Industrial Injuries) Acts. The total estimated numbers employed in the chemicals and allied trades is given (in thousands) as 429.6, divided as follows: coke-ovens, chemicals and dyes, explosives, etc., 249.4 (183.2 men, 66.2 women); oils, greases, glue, etc., 63.5 (50.3 men, 13.2 women); paints and varnishes 37.1 (26.3 men, 10.8 women); pharmaceutical, toilet preparations, etc., 79.6 (40.4 men, 39.2 women). Representative tables are shown below :—

	January, 1949 Thousand Tons			January, 1948 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	126.5*	139.0	—	123.5*	124.0*	—
Sulphur	—	22.9*	66.3*	—	21.7*	93.3*
Pyrites	—	18.0*	63.0*	—	19.3*	62.0*
Spent oxide	—	15.4*	168.0*	—	16.0*	166.6*
Molasses (cane and beet)	44.1	24.1†	272.5	31.8	34.7†	224.9
Industrial alcohol (mil. bulk gal.)	1.66	2.49	7.06	2.26	3.3	7.35
Superphosphates	18.9	19.7	—	18.5	21.4	—
Compound fertilisers	143.4	154.0	—	142.5	157.4	—
Liming materials	—	369.1	—	—	431.2	—
Ammonia	—	6.96*	5.95	—	6.32*	4.31
Phosphate rock	—	93.5	146.5	—	83.9	175.2
Virgin aluminium	2.50	17.1	—	2.57	15.7	—
Virgin copper	—	29.8	115.3	—	37.2	99.2
Virgin zinc	—	17.1	39.9	—	22.0	35.2
Refined lead	—	17.2	23.4	—	18.7	40.2
Tin	—	1.94	19.1	—	2.6	14.9
Zinc concentrates	—	12.9	38.0	—	14.9	57.0
Pig iron	181.0*	—	265.0*	176.0*	—	189.0*
Steel ingots and castings (including alloys)	311.0*	—	1019.0	289.0*	—	777.0
Rubber: Waste collected	—	—	—	—	—	—
Reclaimed	0.35‡	0.35‡	4.27	0.42‡	0.49‡	4.0
Natural (including latex)	—	5.52‡	44.8	—	3.95‡	129.8
Synthetic	—	0.04‡	1.97	—	0.05‡	2.23

* February. † Distilling only. ‡ Average of five weeks.

ECA Funds for British Steel

PROJECTS for the modernisation of steel manufacturing facilities in the United Kingdom, Austria and France, and two aluminium foil projects in France, are the subjects of dollar allocations approved by the Economic Co-operation Administration, involving the equivalent of more than £7 million of ECA funds to be available before June 30, with a long-range total of nearly £12.5 million.

The largest financial aid is to help modernise facilities of the Steel Company of Wales, Ltd., for the manufacture of tinplate and sheet at Margam, South Wales.

There is already under construction at Margam a completely integrated plant to include the unloading and preparation of ore, coke ovens, blast furnaces, open hearth furnaces, a slabbing mill, a hot-strip mill, two tinplate mills and one sheet mill. Approximately $27 million will be required for the purchase of rolling mill equipment and other special items in the U.S.A.

Two projects in Austria, a slabbing and blooming mill at Linz, and a hot strip mill at the same location, were approved by ECA involving a total of $1,668,000 of ECA funds. Also given ECA approval were two mills in France, a hot strip mill at Denain, and a cold mill at Montataire.

$825,000 has also been authorised by ECA for specialised equipment for each of two new aluminium foil plants, one at Rugles near Le Havre, and the other at Froges. These two authorisations each involve ECA funds of $1,100,000 on a long-range programme. The contemplated project will not meet full French home requirements in aluminium foil.

MONSANTO CHEMICAL SALES

Volume Increased by 30 Per Cent

THE achievement of a new stage in the post-war expansion in this country of Monsanto Chemicals, Ltd., is signalised in the statement of the chairman, Mr. E. A. O'Neal, Jr., circulated in anticipation of the 15th annual general meeting of the company, to be held in London on May 11.

This recalled that 1948 saw the completion of several of the firm's post-war projects, including expansion of production of phenol, phthalic anhydride, rubber chemicals and pharmaceuticals and the successful introduction of some new products—Syton for the textile industry, chemical additives for lubricating oils, synthetic adhesives for the timber industry and a limited quantity of new synthetic detergents. This work was carried out at Ruabon where production progress last year showed a marked improvement compared with 1947.

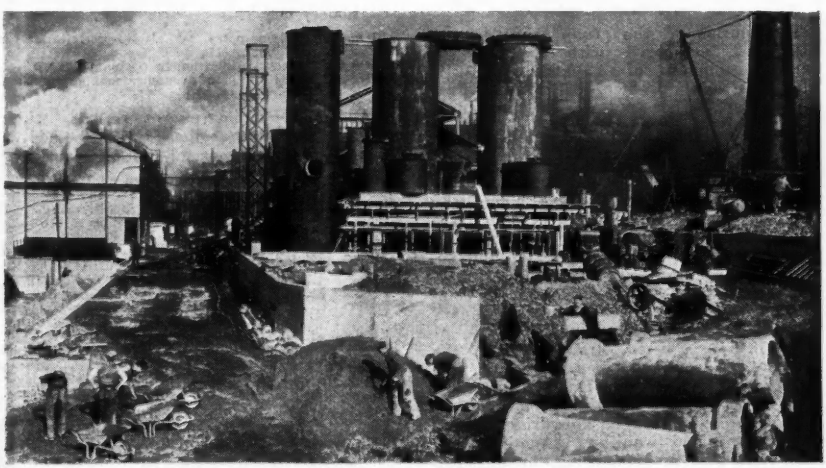
As a result of these developments, sales in 1948 attained a new record level with an increase in volume of approximately 30 per cent over 1947. This increase in business reflected the realisation of new production resulting from the first stages of investment of capital funds obtained in 1947. Direct exports accounted for approximately 30 per cent of 1948 total sales, representing an increase of 37 per cent over 1947. Home demand of exporting industries for Monsanto's industrial chemicals continued strong, thus limiting the firm's direct export volume.

Extension of research facilities was completed at the end of 1948, affording the necessary tools for a large expansion of activities. The number of qualified scientists engaged in research was doubled during the year and facilities were available for further expansion in 1949 as and when suitable personnel could be found. The company was now in a position to carry forward intensive research and development on its own behalf, in addition to receiving the benefits of the large research programme of its American associates.

By the end of 1948 the company had fairly well built up the staff required to carry out and continue expansion at the rate envisaged in its post-war planning, with the possible exception of qualified research scientists. The staff of technical and commercial employees had more than doubled over the years 1947 and 1948.

The post-war expansion programme at Ruabon was 75 per cent complete at the end of the year, and would be fully realised during the first half of this year. Satisfactory progress had been made at the new site at Newport, Mon., where, it was

(*Continued at foot of next page*)



A pictorial "progress report" on part of the new enterprise at Ruabon, showing the stage recently reached in the construction of the sulphuric acid plant

C

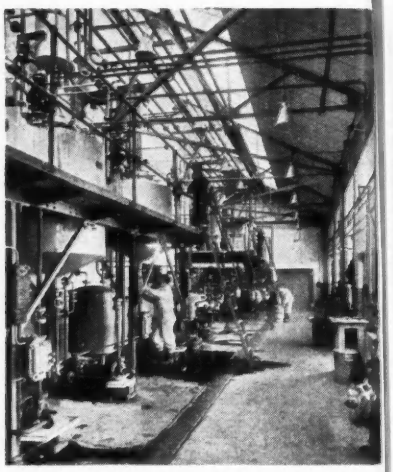
Modern Hormones Plant

Organon's New Scottish Factory

THE new Scottish factory of Organon Laboratories, Ltd., at Newhouse, Lanarkshire, which was opened recently (THE CHEMICAL AGE, *60*, 431), is believed to be one of the most modern of its kind. It includes much that is new in instrumentation and methods, and a very advanced research section. The plant has an area of 55,000 sq. ft. and consists of a series of isolated production units in the rear of the main administrative and research building, each unit linking up in the manufacturing process. Ample provision has been made for the housing of the plant extensions contemplated.

Safety precautions have been carried to great lengths throughout the plant. The firm's products are, briefly stated, the complete range of standardised synthetic hormones, which are available in all appropriate pharmaceutical forms and strengths, and a wide range of vitamin products. Some 60 per cent of the output of the laboratories and factory is exported.

Organon Laboratories, Ltd., maintains a special medical service and advisory department at its London headquarters.



The steroid room in the Organon laboratories at Newhouse, showing modern practice in plant lay-out and the flame proof lamps which are used throughout the works

MONSANTO CHEMICAL SALES

expected, the first major production would start in May, 1949. The Newport project would be completed early in 1950 with approximately 100 per cent greater production capacity than originally envisaged.

The income of the group for 1948 was £1,014,262, compared with that of the parent company of £710,965 in 1947. There was a net profit of £375,172. A final dividend of 30 per cent was recommended, making a total for the year of 45 per cent, the same as in 1947.

At a time when the Anglo-American Productivity Council was not even thought of, the chairman observes, it was noteworthy that Monsanto was already operating on a company basis what it was now hoped to achieve on an international scale, and co-operation as opposed to duplication of effort made it possible for the British company to save many months of preliminary research, design and engineering.

As 1948 progressed, first results of the Ruabon expansion plan began to show, and by the end of the year material increases had been effected in the production of phenol, aspirin, phthalic anhydride, rubber accelerators and vanillin. Another new plant was that manufacturing, for the plywood industry, phenolic adhesives of a type not hitherto produced in Great Britain.

GERMAN INDUSTRIAL TECHNIQUE

The following reports on German war-time industry are now available at H.M. Stationery Office:—

BIOS 1785. Some notes on electro-precipitation in Germany (17s. 6d.).
BIOS 1851. Steam utilisation in Germany (7s.).
BIOS 1862. The German flycatcher making industry Part II (1s. 6d.).

Additional summaries of reports, which may be inspected at the TIDU, 40 Cadogan Square, S.W.1, are as follows:—

FD 5316/47. Production of tantalum at the works Siemens and Halske A.G.
FD 3069/48. Production of tantalum in Germany.
FD 3271/48. Report on the visit to various metal works in Germany.
FD 3565/48. Research developments at the Consortium fur Elektrochemische Industrie G.m.b.H., Munich, since 1938. Acetylene chemistry.
FD 3681/48. Mechanical parts and function of the "Passavant" rotating sprayer for biological purification of water.
FD 3682/48. I. G. Farbenindustrie A. G. Hoechst. Report on the visit to the Salvarsan department. Synthetic pharmaceuticals.
FD 3684/48. C. F. Curtius A. G. Duisberg-Huckingen Chemische Industrie A. G.—Bochum. Manufacture of sulphuric acid.
FD 3047/48. Sunlicht A.G., Mannheim. Manufacture of soap and soap powders.
FD 3092/48. German war-time developments in spectrochemical analysis.
FD 858/49. Irradiation of milk, with notes on developments of electric and mechanical oscillations and ultra sound waves.

Nonyl Alcohol

Interesting Possibilities of a New Synthesis

From Our Special Correspondent

NONYL alcohol is known to students of chemistry as one of the higher primary alcohols, but few chemists have ever seen this substance, which for many years has been of purely academic interest. In its search for new industrial chemicals, the Standard Oil Company and its subsidiary Indoil Chemical Company have developed a process of synthesising nonyl alcohol and commercial quantities may be available within a year or so.

The alcohol as produced in America is a mixture of branched chain primary alcohols. The general formula is R CH_2 OH, where R is a branched octyl radical. The branching is of a simple character, the principal component being trimethylhexanols, with dimethyl. heptanols as a minor component.

The nonyl isomers have the following properties:—

Molecular weight	144
Refractive index	1.4390 N^{20}_{D}
Specific gravity	0.845 (15.6° C.)
Aldehyde content	0.30 wt. per cent
Neutralisation number ...	0.02 mg. KOH/g.
Colour, saybolt	30
Mixed amline point ...	−15° C.
Solubility in H_2O (25° C.) ...	0.05 wt. per cent
Viscosity—	
130° F.	8.0 centistrokes
100° F.	10.4 centistrokes
−40° F.	633 centistrokes
Flash point (open cup) ...	80° C.
ASTM Distillation—	
Initial	193° C.
5 per cent	196° C.
50 per cent	198° C.
95 per cent	201° C.
Max.	206° C.

Characteristics Compared

In comparison with octyl alcohol, which has been available in commercial quantities for some years, nonyl alcohol has a somewhat greater viscosity and a higher boiling point. Some of the main physical characteristics of octyl alcohol are these:—

Refractive index, N^{20}_{D}	1.4313
Specific gravity, (15.6° C.)	0.835
Mixed amline point	9.2°C.
Viscosity, Centipoises—	
at 100° F.	5.3
−40° F.	540
ASTM Distillation—	
5 per cent	179° C.
50 per cent	182° C.
95 per cent	185° C.

Judging from development work carried out in the laboratories of the Indoil Chemical Company, the most promising uses of nonyl alcohol can be listed as follows:—

1. The formulation of lacquers and enamels.
2. As a dispersing and wetting agent either alone or as modifier for other wetting agents.
3. As a component of penetrating oil.
4. Defoaming agent.
5. As an intermediate in the production of medium and high boiling esters for use as solvents and plasticisers and also surface active agents made by condensation of ethylene oxide with nonyl alcohol or with its derivatives.

Some of the medium boiling esters of nonyl alcohol possess high solvent power and will certainly be of interest to manufacturers of cellulose lacquers and other paint preparations. Nonyl acetate has a boiling point 87-92° C. (10 mm.); density 0.873 at 25° C. refractive index 1.4260 and a viscosity of 1.77 at 100° F., and 0.88 at 210° F.

Another interesting solvent is nonyl acrylate with a boiling point, 68-73° C. at 1 mm. and density 0.884 at 25° C. and refractive index 1.4404. Nonyl methacrylate boils at 76-78° C. (1 mm.).

Plasticisers

The higher boiling esters of nonyl alcohol hold out considerable promise as plasticisers able to endow plastics compositions with a good degree of flexibility at low temperatures. In this respect they may well be competitive with these esters prepared from octyl alcohol, *e.g.*, dioctyl phthalate (DOP).

Dinonyl phthalte is compatible with all the important plastics and also with other commercial plasticisers and tests carried out in the U.S.A. show it to possess a brittle point somewhat more than DOP, good colour stability, electrical properties comparable with DOP, low water absorption and a slight superiority of the nonyl ester over the octyl ester when tested for ageing under exposure to air and sun.

Other important nonyl plasticisers are dinonyl adipate, which is substantially less volatile than octyl adipate, and trinonyl phosphate, which compares very favourably with trioctyl phosphate and is particularly useful where the combination of flame resistance with excellent low temperature properties is desired.

Other nonyl alcohol derivatives which deserve attention by the organic chemist are nonyl chloride, nonyl bromide, nonyl thiocyanate, nonyl mercaptan, nonyl amine, dinonyl ether, vinyl nonyl ether, nonyl aldehyde and nonanoic acid. (*Continued overleaf*)

An Official Verdict on DDT

Reassuring Statement on Toxicity by U.S. Authorities

THE subject of possible injury to human life and to animals by the widened use of DDT insecticide has been revived in the U.S.A. by a fresh crop of somewhat alarmist reports, and has now evoked an official statement by a U.S. Federal Security Agency and the U.S. Department of Agriculture.

This, representing the agreed views of government agencies principally concerned with the uses of DDT, says:

"It is well recognised that DDT, like other insecticides, is a poison. This fact has been given full consideration in making recommendations for its use. There is no evidence that the use of DDT in accordance with the recommendations of the various Federal agencies has ever caused human sickess due to DDT itself.

Other Factors

"This is despite the fact that thousands of tons have been used annually for the past four or five years in the home and for crop and animal protection. However, minor toxic symptoms may be produced by kerosene and various solvents used in DDT and practically all other insecticidal mixtures.

"Statements that DDT is responsible for causing the so-called 'virus X disease' of man and 'X disease' of cattle are totally without foundation. Both these diseases were recognised before the utilisation of DDT as an insecticide.

"The Food and Drug Administration has not prohibited the use of DDT in spraying dairy cattle and barns. Studies by the Bureau of Entomology and Plant Quarantine have shown that DDT when used on dairy cattle or when present on fodder fed to dairy cattle may appear in the milk. They also say that DDT in small quantities can be detected sometimes in milk, following ordinary use of the insecticide for fly control in dairy barns.

"Because of the vital importance of milk in the diet of infants, children and people of all ages, it is essential that proper precautions be taken to protect the milk supply. Modifications of the recommendation made by the Department of Agriculture on the use of DDT on dairy cattle were made merely as a precautionary measure. There is no justification for public alarm, the statement concluded, "as to the safety of the milk supply from the standpoint of DDT contamination."

Solvent Extraction

Increasing world demands for vegetable oil make efficient methods of solvent extraction more than ever important. A series of six continuous operations are necessary in the process and these are competently described in Bulletin 025 recently issued by Bamag, Ltd., London. The bulletin, which covers continuous solvent extraction and the Bamag multi-stage solvent circulation extractor, has some excellent diagrams that help considerably an understanding of the plant and processes involved.

NONYL ALCOHOL

(Continued from previous page)

All these compounds can be readily made from the alcohol, *e.g.*, nonyl alcohol reacts with hydrogen chloride at elevated temperatures and pressure to give nonyl chloride and the bromide is prepared by passing hydrogen bromide into the alcohol while heating.

No uses have yet been suggested for all these derivatives, but the nonyl mercaptan appears to offer interesting possibilities as a polymerisation modifier and as a base for further derivatives including surface-active ethylene oxide condensation products.

Nonyl amine is considered to offer some promise as a potential base for the synthesis of rubber accelerators, antioxidants, dyes, etc. Polymeric compounds produced from nonyl aldehydes have not yet been investigated and it is thought likely that they may be of some interest to the paint as well as the plastics industries.

Nonanoic acid ($C_8H_{17}COOH$) made by the oxidation of nonyl alcohol or nonyl aldehyde is miscible with most common solvents. The sodium salt is extremely soluble in water and the heavy metal salts are oil-soluble and show promise as paint driers. The metallic nonanoates may eventually take their place alongside the metallic naphthenates both as driers and also as specialised compounds for use in controlling the physical characteristics of paint.

The range of nonanoic acid derivatives includes nonanoic anhydride, nonanozl chloride, nonyl nonanoamide, nonanonitrile, ethyl nonanoate, allyl nonanoate, etc. Research indicates that nonanozl chloride is likely to be useful for the synthesis of new compounds, such as phenyl octyl ketone, a solvent boiling at 110-116° C. at 0.12 m., and 2-methylnaphthyl octyl ketone, another solvent boiling at 158-168° at 0.12 mm.

"SOLID" PETROLEUM

Unconventional War-Time Research

MANY unusual jobs had to be carried out by chemists and research workers during the war, and one of these which, of course, could not be revealed at the time, was the development of a process for the manufacture of "solid" petrol at the Anglo-Iranian Oil Company's research station at Sunbury.

The following account of how this problem was overcome and the possible uses of petrol in solid form is reproduced from the April issue of the company's magazine *Naft*, in an article by A. Millien.

Government Research

By 1944, H.M. Fuel Research Station at Greenwich had developed a promising process for the "solidification" of petrol to the point where it was considered that work was urgently necessary to translate the process to large scale continuous production. The process involved the preparation of an emulsion of petrol in water containing the ingredients for a urea-formaldehyde synthetic resin, together with casein emulsifying agent, a wetting agent and a catalyst to promote the formation of the resin.

The emulsion, when freshly prepared, was somewhat of the consistency of thick cream, but as the resin began to set the whole took on the appearance of a solid, despite the fact that it contained up to 98 per cent of petrol (normally 95 per cent).

The material consisted of a honeycomb structure of synthetic resin, the petrol being held in the cells of the resin, which a photomicrograph revealed as a cross-section of the "solid" petrol magnified 43 times. In this form the petrol, if dropped, simply broke into pieces like a solid, and since there was no spreading of inflammable liquid, the fire risk was negligible. Moreover, the pieces could be swept up and the petrol recovered by squeezing the material like a sponge. Tracer bullets from a Bren gun disintegrated the "solid" but did not set it alight.

Resin Content

At the stage where the problem was handed over to Sunbury, the "solid" petrol had been prepared in relatively small quantities in the laboratory, and several, but not all, of the variables in the process had been studied. Several attempts at small scale continuous production had been made, but none was really successful owing to the fact that the resin began to form so quickly that considerable "sleight of hand" was required to get the emulsion out of the mixer before it became semi-solid. At this intermediate stage of the hardening process the emulsion was very unstable and, if disturbed, was liable to "break" and form free petrol.

The discovery that it was very much easier to make the emulsion minus the catalyst quickly led to the development of a small continuous plant in which the chemical solutions and the petrol were fed in together at the required rates to make the final composition right, the catalyst being stirred into the then stable emulsion just before it was poured into containers to harden. From this plant, which produced "solid" petrol at five gallons per hour, the process was successfully stepped up to 2000 gallons per hour by adapting an already existing paddle-agitated mixer at NOR, Llandarcy.

This considerable jump in the scale of operations, although carried out in two or three months, was not accomplished easily. There are a great many variables which can affect the emulsification process, such as the purity of the chemicals used (urea, formaldehyde, casein catalyst). As most of these chemicals are corrosive and the effect of traces of iron on the emulsification is disastrous, the correct protective coating for the chemical storage tanks and emulsification plant had to be found.

Transit

Naturally the harder the material is, the more rough handling it will stand in transit, but the more difficult it will be to recover all the petrol when it is wanted. The effect of contact with the chemicals on the quality of the recovered petrol also had to be considered—the product would have been useless if, for example, the final result had been a recovered petrol full of gum or lacking involatility or lead.

However, by the end of 1944 all these difficulties had been satisfactorily overcome and the process was demonstrated at 2000 gallons per hour. One of the main reasons for production of this solid form of fuel had been to supply isolated troops or parties of raiders in the jungle from the air, so that dropping and recovery tests had to be carried out.

Practical uses of "solid" petrol in peace time would not seem to be very extensive, mainly because it would be too costly to produce economically under normal conditions. It has, however, been tried out as a fuel for lifeboat cookers and sea-water stills with some success.

APPLICATIONS OF TRACER TECHNIQUE*

Widespread Uses in Science and Industry

by T. B. RYMER, Ph.D., F.Inst.P.

MY object in this lecture is to give an indication of the many uses of tracer elements in research, leaving to later speakers the detailed exposition of the various techniques.

It is impossible to give any precise figures for the sensitivity of the tracer method, owing to the wide variety of experimental conditions, but it is generally true that it is possible to measure accurately amounts of material of the order of a microgram, and in many cases as little as 10^{-9} gm. has been measured with an accuracy of a few per cent.

Radioactive Atoms

The limiting factor is usually the amount of radioactivity which can be tolerated. Although the radioactive atoms have physical and chemical properties identical with ordinary atoms, it is usually inadvisable to have too high a proportion of them in the system, lest the radiations they produce should give rise to unwanted chemical reactions. This point demands particular attention in biological studies.

In considering possible differences in the properties of ordinary and tracer atoms, we first note that a radioactive atom is indistinguishable from a non-radioactive one except at the instant when the nucleus disintegrates with the emission of radiation. Up to that time, the only difference between the tracer atom and the others is its different mass. Since chemical properties are determined by the extra-nuclear electron structure rather than by the nuclear mass, it follows that the only possible difference between a tracer atom and an ordinary one is that there might be a small difference in reaction rates.

Use of Deuterium

This difference would be expected to be most marked in experiments in which deuterium is used as a tracer for hydrogen, since the mass ratio (2 :1) of these isotopes is particularly large. However, Dole[1] has shown that the percentage of deuterium in the water formed by the combustion of various organic substances (benzene, cholesterol and halibut liver oil) is within 7 per cent of that in ordinary water taken from a snow-fed lake.

It follows that there is no evidence of appreciable discrimination between hydrogen and deuterium in all the complex reactions giving rise to these substances. Still more impressive is the evidence of Schoenheimer and Rittenberg[2], who have shown that the ratio of the amounts of nitrogen isotopes of masses 15 and 14 (N15 : N14 = 0.368 per cent) in nine different natural amino acids is constant to within 0.006 per cent.

An illustration of the use of radioactive tracers for the measurement of small quantities of material is in the measurement of vapour pressures. The Knudsen method for the measurement of very small vapour pressures consists in placing the substance in a little oven situated in an evacuated vessel and closed except for a small aperture. The evaporating molecules escape through the hole in the oven and, crossing the evacuated space in straight lines, are condensed on a collecting plate.

Vapour Pressure

The kinetic theory of gases enables the vapour pressure to be calculated from the rate of deposition on the collecting plate, the size of the oven aperture, the temperature and the molecular weight. The employment of radioactive material extends the use of the method to substances of smaller vapour pressure than would otherwise be possible. The mass of material deposited is now determined by measuring its radioactivity and this permits the accurate measurement of a small fraction of a milligram.

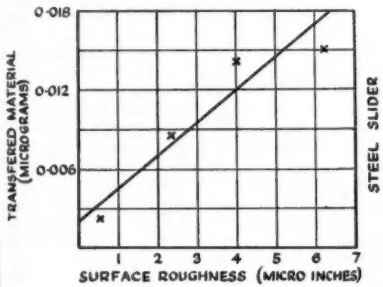
The sensitivity of the radioactive tracer method has found an application in the study of lubrication. By irradiating bearing metal in the atomic pile and then, after a period of running, testing the lubricating oil for radioactivity, it is possible to make an accurate measurement of the rate of abrasion of the metal.

In another investigation, Sakman and Burwell[3] have studied the transference of copper from one bearing surface to another. A plate of beryllium-copper was activated in the cyclotron and polished electrolytically. A hemispherical slider of some other metal is run once across it under a measured load. The activity acquired by the slider is then measured with a G-M counter and gives a measure of the mass of material transferred. A layer of 10 mg./cm.^{2} is then etched off the beryllium-copper block

* Read to London and South Eastern Counties Section of the Royal Institute of Chemistry at Reading University on November 19, 1948.

and the activity of the resulting solution determined. The copper is then precipitated from the solution and weighed.

These observations enable the specific activity of the copper to be determined and hence the mass of copper transferred to the slider can be calculated from the observed activity. The accompanying figure, taken from Sakman and Burwell's paper, gives a good idea of the sensitivity and accuracy of the method.



Diffusion processes readily lend themselves to investigation by tracer methods. In particular, the diffusion of atoms through a crystal lattice of other atoms of the same type is a subject of considerable physical interest because of the information it gives about the solid state.

The self-diffusion of lead was studied by Hevesey, Seith and Keil[4] using natural radioactive lead before artificial radio-elements became available. Banks[5] has studied self-diffusion in zinc and Shockley and Nix[6] have examined copper.

A typical method is to deposit a layer of active metal on an inactive base. After heat treatment thin sections are shaved off the metal and the activity of successive sections measured. The distribution in depth of the radioactive metal is thus determined.

Quantitative Analysis

Tracer technique has proved of great value in the quantitative analysis of mixtures. A biochemical product for example may contain, say, 20 different amino acids and often no reagents are known which are specific for an acid and also quantitative. Any attempt to isolate an acid in its pure state usually means that it is not extracted quantitatively.

The tracer method of avoiding this difficulty is as follows: the acid to be examined is synthesised using a radioactive element and a known quantity of x gm. is added to the unknown mixture. The acid is then isolated in the pure state, but not necessarily quantitatively, and its activity measured. Then if the activity of the separated acid is the same as that of x/n gm. of the original synthetic acid, it is known that the reagent used has separated a fraction $1/n$ of the material present and hence if the amount isolated is m gm. the amount of the acid originally present is $(m\,n - x)$ gm.

Optical Activity

This technique has been used for the study of the d and l forms of optically active material.

A particularly valuable use of tracer elements is in the pictorial representation of the distribution of an element through a system. If, for example, a plant be grown from nutrient containing radioactive phosphorus, then a leaf of the plant placed in contact with a photographic plate will produce a pattern: the parts rich in phosphorus give off radiations which blacken the plate. It is now possible to obtain a resolution of a few microns in radiographs made in this way.

A variation of this technique which is of value in some cases is illustrated by Stevens' and Lewis'[7] work on silicon rectifiers. These have a few tenths per cent of aluminium mixed with the silicon, and it is of interest to know whether the aluminium is distributed uniformly throughout the silicon.

If such a silicon aluminium specimen is irradiated with neutrons, the silicon atoms either do not become radioactive, or else the activity quickly disappears on removing the specimen from the neutron source. Some of the aluminium atoms, on the other hand, become converted to radioactive sodium atoms with a half life of 14.8 hours.

Selective Activation

Thus, if the specimen is placed against a photographic plate a few hours after removal of the neutron source, the blackening produced arises only from the aluminium atoms and serves to indicate their distribution.

This selective activation of specimens has been used by geochemists for the study of mineralisation processes. Minerals are formed in sedimentary rocks by precipitation from solutions which have percolated through the rocks in past ages. When such a rock is subjected to neutron radiation, the matrix is hardly activated at all since it consists of elements of low atomic number which mostly give rise to inactive or very short-lived isotopes.

The mineral content on the other hand usually becomes powerfully radioactive and its distribution can be recorded by placing the rock in contact with a photographic plate.

It has been suggested that the measure-

ment with a G-M counter of the neutron-induced activity of rocks may prove to be a convenient method for their rapid assay.

In the field, the geophysicist is making use of both natural and neutron-induced radioactivity. When an oil well is drilled through water-bearing strata, it is often desirable to reinforce the lining of the well with cement and the problem arises of testing the reinforcement for uniformity. This is done by mixing with the cement a little carnotite (a mineral which is naturally radioactive). A G-M counter is then lowered down the well, and the radiation intensity recorded by it is a measure of the thickness of the cement lining in its neighbourhood.

Sedimentary Rocks

The natural radio-elements are so widely distributed that most sedimentary rocks are slightly radioactive, the activity varying from one type of rock to another. Some use is made of this in well-logging. A G-M counter is slowly lowered down a well and the activity recorded as a function of depth. The curve obtained shows discontinuities indicating the boundaries of successive strata and provides a very rapid means of investigating underground structures.

A development of this technique which shows future promise is to use a neutron source in conjunction with the G-M counter. Two types of recording are then possible. If the counter is arranged to record neutrons it will give a measure of the back scattering of neutrons by the surrounding rocks.

Since neutrons are scattered far more by hydrogen than by any other element, the method serves to detect the presence of rocks containing water. If on the other hand the counter is arranged to record gamma rays, it will give a measure of the neutron induced activity of the surrounding rocks, and it is to be expected that this will be highly specific in regard to rock type.

In conclusion, brief mention must be made of stable isotopes in tracer technique. These require a mass spectrograph for their detection and this is a much more elaborate instrument than the counters used for radioactive tracers. On the other hand, stable isotopes are known for all the elements of low atomic weight which have no suitable radioactive isotope; (indeed, the separation and detection of stable isotopes is simplest for low atomic weight elements).

Separated Isotopes

Stable isotopes, therefore, provide a useful additional tool in the study of such important elements as hydrogen, carbon, nitrogen and oxygen; separated isotopes of these and other elements will, it is expected, shortly be available commercially.

The sensitivity of detection of such isotopes is lower than in the case of radioactive isotopes, but nevertheless it is possible to detect and measure them after a dilution with the normal atoms of about 10^{4} : 1.

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Cold Extrusion of Steel

Wider Applications Indicated

COVERING work done for the U.S. Army Department by the Heintz Manufacturing Company, of Philadelphia, to adapt German-developed technology to American productive processes, extensive new data on the cold extrusion of steel have just been released by the U.S. Office of Technical Services in a new 138-page report.

While the research described relates specifically to ordnance, the new information is expected to be of value in any field in which the extruding low-carbon steel will be useful. In many cases the cold extrusion of steel is expected to replace extruded and drawn non-ferrous products as well as ferrous castings.

An important section deals with the development of efficient, automatic phosphatising (bonderising) techniques, and actual test runs on ordnance materials. Phosphatising, the application to steel of a lubricating finish for cold extrusion, is the key to the success of this process.

Tests indicated that cold extrusion could not only susbtantially reduce the cost and time necessary for the production of many parts, but also could improve their mechanical properties and result in a saving of metal. It is suggested that many articles could be redesigned for more efficient production by cold extrusion without impairing their usefulness.

[Cold Shaping of Steel—Summary Report, photostat $17.50, microfilm $5.50, from the U.S. Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D.C.]

FUTURE OF THE IMPERIAL INSTITUTE

"Entering a New Stage of Scientific Service"

As from April 1 the financial and administrative control of the scientific activities of the Imperial Institute, South Kensington, were transferred to the Colonial Office, and that of its Empire educational work to the Ministry of Education. The change is mainly administrative in character, and the staff, which, it is hoped, will be increased on the scientific side, will continue to function in the present buildings.

Sir Harry Lindsay, the director, in a foreword to the annual report just published, summarises briefly the story of the institute, pointing out that for more than 50 years its laboratories, intelligence offices, library and reading-rooms have provided all Governments and very large numbers of the citizens of the Empire with scientific and technical information not commonly available elsewhere. In his view, the changes now made are undoubtedly wise, and will provide for normal expansion in new directions of value both at home and overseas. The institute, he points out, is entering a new and promising stage in its long career of loyal and useful service to the British Commonwealth of Nations.

The two main sections of the report reflect the growing interest of the State, as well as of commerce and science, in new Empire sources of minerals, abrasives, oil-seeds, plant fibres, tobacco, hides, skins, essential oils and insecticides.

Mineral Sources

The mineral resources department of the Institute reports a 14 per cent increase in inquiries covering a wide field. Prominent among them are questions concerning world resources of coal, bauxite and gypsum. Other inquiries dealt with concern non-metallic minerals, and comparatively rare and hitherto little known raw materials that are proving of such importance to modern industry. These include caesium, gallium, indium, germanium, selenium, tellurium, lithium, cerium, and tantalum.

Many government departments and quasi-government organisations have also sought complete facts about diatomite—its nature, occurrence, quality, working, production, transport, treatment, uses, prices, alternatives and statistics. In recent years this mineral has been mainly drawn from dollar sources, but for some time the institute has tried to find Empire substitutes, with Kenya as the chief sourse, and even Skye has been actively considered (THE CHEMICAL AGE, *59*, 347).

In the past few years the institute has also emphasised to Government geological surveys, private geologists and mining concerns the possible presence of vermiculite in their respective territories. Private and official reports of vermiculite found in entirely new areas include the Gold Coast, Nigeria, South-West Africa, and Mysore, although its economic possibilities in some of these locations are not yet known. South Africa continues to be the chief Empire supply source of vermiculite, and new finds have been reported from Northern Transvaal and Natal.

Valuable Deposits

New outlets and applications for Sierra Leone micaceous haematite have been considered as a weighting ingredient in oil drilling muds, as heavy medium for coal cleaning, granules for roofing felt, welding red coatings, and for use in powder metallurgy. Examination of mineral specimens from Tanganyika indicated that one of them was a member of the Euxenite-polycrase series and was "appreciably radio-active"; another was a garnet of good quality that was found suitable by a manufacturer for abrasive work.

The laboratories of the mineral resources department are stated to be still undermanned, but a hope is expressed in the report that after the administrative transition enough young men will be recruited to build up a new Colonial organisation for greater developments.

The other scientific section of the institute that the Colonial Office will control is the plant and animal products department.

To assist the general plans for increasing world supplies of vegetable oils and fats, tests of sunflower seeds—four new and two older strains—have been made in Nigeria and Sierra Leone.

With a view to saving dollars, the Director of Agriculture, Kenya, is experimenting with some plants of Mexican fibre, supplied from the Royal Botanic Gardens at Kew. Results of the trials, the report states, are awaited with much interest, "since a source of the fibre within the sterling area would be of considerable value."

Commenting on a report of the large-scale experiments at the sericultural station at Mont Hawa (Ituti), Belgian Congo, the committee on silk states that very considerable advances have been made in the elucidation of the problems in the application of sericulture to conditions in Africa, but similar introduction to British countries would appear to be an expensive undertaking.

Progress in Medicinal and Fine Chemicals—VII

Limitations of the Use of Streptomycin

by G. COLMAN GREEN, B.Sc., F.R.I.C., A.M.I.Chem.E.

WORK on the second of the two most important antibiotics, streptomycin, continues on an exceptionally ample scale, both in the study of its therapeutic use (especially in the treatment of tuberculosis) and in its chemical structure.

Streptomycin still is not freely available in Britain and has only recently ceased to be acutely scarce. Hitherto, the major source of supply has been the U.S.A. and these supplies have been mainly restricted to the treatment of miliary tuberculosis and tuberculous meningitis in selected hospitals (*Pharm. J.*, September 6, 1947, 160).

No Panacea

The allocation of the antibiotic on a new regional basis was announced in September, 1948. At the same time, the authorities concerned have seen fit to utter a word of caution to the effect that streptomycin is not a panacea and carries important risks of toxicity. Moreover, cures do not reach 100 per cent in the three types of tuberculosis (acute miliary, meningeal and ulcerative tracheobronchitis), for which it has constituted the best treatment yet found.

Public attention has been directed so consistently to the use of this antibiotic in tuberculosis that there has developed a tendency to lose sight of the fact that streptomycin has a number of other advantageous applications. It is, of course, generally valuable, in the control of certain gram-negative and, as well, of certain gram-positive micro-organisms which are resistant to penicillin or the sulphonamides.

Keefer *et al.* (*J. Amer. Med. Ass.*, 1946, *132*, 4) examined the records of 1000 cases in the U.S.A. and suggested that the best results were obtained in tularæmia, *H. influenzæ* meningitis, and pneumonia due to Friedländer's bacillus or *H. influenzæ*. Further, all cases of meningitis, bacteræmia and urinary tract infection due to gram-negative micro-organisms (which are, for example, not generally susceptible to treatment with penicillin) should be treated by the drug.

An interesting discussion on streptomycin took place in London last autumn before the Medical Society of London (*Brit. Med. J.*, 1948, *4583*, 831) and readers interested in current therapy of tuberculosis should refer to this report. Meanwhile, the Tuberculosis Trials Committee of the Medical Research Council has already reported on the use of streptomycin in tuberculosis (*Lancet*, 1948, *i*, 582; *Brit. Med. J.*, 1948, *ii*, 769) and there has followed from the Pathological Sub-Committee (*Lancet*, 1948, *ii*, 862) a report on specific laboratory tests used in these trials for testing tubercle bacilli for streptomycin sensitivity and for assaying streptomycin in body fluids.)

In the sensitivity tests the use of the non-ionic emulsifying agent, Tween 80, in the culture medium was of particular interest. This has a dispersive effect on the normally granular growth of the bacillus, which enables some control to be exercised over the numbers of viable organisms used in innocula. The Tween 80 seems also to exert a protective action against toxic substances which would retard growth, besides acting as a growth promoter. The latter effect is thought to be due to molecular orientation at the medium/bacterial protoplasm interface by which the lipophilic end of the Tween 80 molecule (which is an oleic acid moiety) is presented at the surface of, or actually within, the protoplasm. Oleic acid is a well-known growth promoter for *M. tuberculosis*.

A satisfactory assay method in body fluids is essential to give information as to whether suitable blood-levels of the antibiotic are being achieved. The method used in the trials under discussion was that due to May *et al.* (*Brit. Med. J.*, 1947, *i*, 627) and is a capillary tube method requiring small amounts of serum and using the Friedländer bacillus, *Klebsiella pneumoniæ 3* as the test organism.

Growth of Resistance

More recently it has been pointed out (*Lancet*, 1948, *ii*, 733) that one of the difficulties in treating tuberculosis with streptomycin is the ease with which resistance to the antibiotic may be induced in the infecting strains of *M. tuberculosis*. That has been described as the Achilles heel of streptomycin.

Brownlee *et al.* have found that there is a significant synergism between streptomycin and sulphetrone (4 : 4′-bis(γ-phenyl-N-propylamino) diphenyl sulphone tetrasodium sulphonate) in tuberculous guinea-

pigs. They have now tested the combination of these drugs clinically and find no clear-cut advantage; but they got an "impression" of synergism which they considered worthy of further exploration (*Lancet*, 1947, *ii*, 897).

In the course of these experiments they noted an enormous increase in resistance on the part of the infecting organisms after streptomycin had been administered to the patient. This was in contrast with what had been their experience when working with animals.

They consider that streptomycin is unsuitable in cases of chronic lesion of lungs or lymph nodes because the organism may be stimulated into rapid reproduction. Because tubercular meningitis and miliary tuberculosis are intractable in nature it is considered that the use of streptomycin is justified in such cases.

The first of the reports on the planned large-scale trials of streptomycin, with carefully controlled use of the drug, in the U.S.A., where streptomycin was much more freely available in 1947 (*J. Amer. Med. Ass.*, 1947, *135*, 634). A further report has now appeared (*J. Amer. Med. Ass.*, 1948, *138* (8), 584).

In this a reduced dose, which can be achieved without loss of therapeutic efficiency, is recommended. Such a reduced dose leads to a considerable reduction of the toxic manifestations which have always been so troublesome with streptomycin. It is now recommended that the dosage of streptomycin be reduced from 2.0 grams daily for 120 days to 1.0 gram daily for the same period in the treatment of tuberculosis. Furthermore, the new dosage has been found to be as effective in two daily doses as in the former five daily doses.

Warning

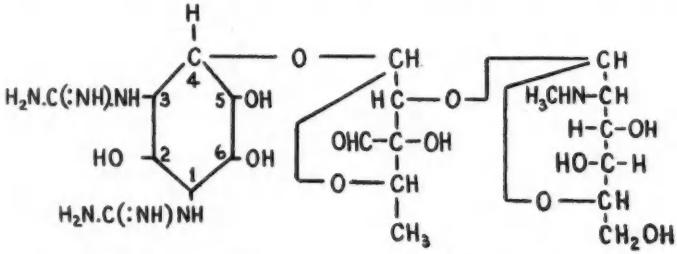
By this modified treatment the development of toxic symptoms is much reduced, but the main difficulty in the treatment of tuberculosis with streptomycin remains—namely, the development in the infecting organism of resistance to the drug. Because of this, the body responsible for organising trials in the U.S.A. makes similar recommendations to those of Brownlee and his colleagues which have been mentioned. They think that streptomycin should be used only where life is threatened.

It has been mentioned in earlier reviews that streptomycin has been found to be effective in tularæmia, which is transmitted to man from rodents by the dog ticks, etc. The organism which is transmitted is *Brucella tularensis*.

Plague Experiments

Because of the close biological relationship between this organism and *Pasteurella pestis*, streptomycin has been tested in experimental plague produced by this micro-organism in animals (Herbert; *Lancet*, 1947, *1*, 626). The drug was found to be strikingly effective with short periods of administration, compared with the administration of sulphathiazole over prolonged periods in the treatment of the disease. *In vitro*, 3 units/ml. gave rapid sterilisation of a virulent culture of plague bacillus. In mice infected with a virulent strain 1600 units per day for 3½ days gave 90 per cent, 95 per cent, and 35 per cent protection when administration was commenced 0, 24 and 48 hours after infection.

Mainly by the work of Folkers, Wintersteiner and Wolfrom the structure of streptomycin has been established:



The molecule, therefore, consists of two parts. One is streptidine a meso-form of 1 : 3 - diguanidino-2 : 4 : 5 : 6 - tetrahydroxycyclohexane and the other part is streptobiosamine, a characteristic sugar containing N-methyl-L-glucosamine.

Titus and Fried (*J. Biol. Chem.*, 1948, *174*, 57), using the counter-current distribution technique of Craig, have obtained evidence that streptomycin exists in the form of a number of tautomeric modifications, the relative proportions of which depend upon the *p*H. These tautomers were found to be easily separable by chromatography.

(*Continued at foot of next page*)

Beryllium Poisoning Hazards Recognised

Seven Safeguards Proposed in the U.S.A.

FOR the making of fluorescent lighting tubes in the United Kingdom the use of beryllium oxide has now been fairly generally superseded, but, following the death from BeO poisoning of a research worker, this has now been added to the list of industrial diseases scheduled under the National Insurance (Industrial Injuries) Act. A large part of the beryllium used in this country is imported, not separately, but already alloyed with copper, the latter forming something like 95 per cent of the alloy. The poison risk, therefore, would appear to be small, except in the chemical works where compounds are made, and where protective measures are, of course, in force (THE CHEMICAL AGE, *59*, 778 and *60*, 348).

In the U.S.A., however, the risk is rated higher. This is indicated by the fact that, prompted by reports of several cases of beryllium poisoning in connection with the disposal of burnt-out fluorescent lamp tubes 18 representatives of industry, education, and government groups, meeting in New York in response to a call from the Department of Health and Sanitation, have framed a set of precautions to be followed in disposing of such material.

Careless breaking of fluorescent tubes, it was pointed out, might result in skin cuts giving rise to a condition known as granuloma, a " benign " tumor of the skin. The inside surfaces of many of the fluorescent bulbs made in the U.S.A. are coated with a phosphor powder, it was stated, and, while its composition may vary, the phosphor usually contains beryllium. There is also the possibility of a health hazard in the inhalation of the dust which is liberated when a tube is broken.

The safeguards proposed by those attending the meeting were: (1) Discarded or worn-out tubes should be kept away from children and beyond their reach; (2) Tubes should never be broken or placed in incinerators; (3) Tubes should be delivered directly to refuse collection trucks, or held until such delivery can be made; (4) Tubes should never be placed in open containers in the street; (5) If a tube is accidentally broken, the fragments should be swept up and wrapped in heavy paper; (6) Broken fragments of fluorescent tubes should never be handled without gloves; (7) If cut by a broken tube, medical advice should be sought at once.

PROGRESS IN MEDICINAL & FINE CHEMICALS

(Continued from previous page)

A second streptomycin, Streptomycin B, has been isolated from streptomycin concentrates after chromatographic separation on alumina and crystallisation as reineckate. Streptomycin B has about one-eighth the activity of streptomycin. Degradation studies by Fried and Titus (*J. Biol. Chem.*, 1948, *70*, 3615) show that, like streptomycin itself, Streptomycin B contains streptidine and streptobiosamine; but, in addition, it contains D-mannose and is thus to be regarded as mannosido-streptomycin.

Thorne and Petersen (*J Biol. Chem.*, 1948, *176*, 413) have isolated two new antibiotics which they describe as xanthomycin A and xanthomycin B because they are yellow in colour and are produced by a *Streptomyces*. The producing organism belongs to a species not yet identified. The two antibiotics are characterised by high potency and extreme toxicity.

Another antibiotic has been isolated from an as yet unidentified *Streptomyces* by Revett and Petersen (*J. Amer. Chem. Soc.*, 1947, *69*, 3006). This has been called streptolin. It is claimed that it resembles streptomycin and streptothricin in many ways but differs from these antibacterial substances in distinctive respects.

Streptolin is active against certain gram-positive and gram-negative micro-organisms but is rather toxic to mice. Later, Petersen reported (*J. Amer. Chem. Soc.*, 1947, *69*, 3145) the isolation of streptothricin from the liquors from which streptolin had been removed.

Grisein is an antibiotic produced by certain strains of *Streptomyces griseus* which are incapable of producing streptomycin. It was first isolated by Waksman (*Ann. N.Y. Acad. Sci.*, 1946, *48*, 73). Grisein is streptomycin-like but differs from streptomycin and streptothricin in its narrower antibacterial spectrum and its lack of basic properties.

Waksman has studied this antibiotic further (*J Bact.*, 1948, *55*, 739) and finds that it is equally effective *in vivo* towards sensitive bacteria as it is *in vitro*.

Some—but not all—streptomycin-resistant strains are sensitive to grisein and grisein seems to exert a synergism, in some cases, with streptomycin. It would seem, however, that, for the moment at least, clinical interest in grisein is overshadowed by that in streptomycin.

(To be continued)

ECONOMICAL DRYING PROCESSES

Official Plan to Collate Industrial Experience

ONE of the most conspicuous means of securing economies in industrial processes—and especially in those of chemical industry—is by the reduction of wastage of fuel and of heat. This, the continuous study of the Fuel Efficiency Branch of the Ministry of Fuel, is the object of a scheme initiated by the official organisation, which seeks to use the experience of industries on the widest scale so far attempted in relation to the use of heat in drying processes.

Details of what is intended have now been presented in the Ministry's official organ, *Fuel Efficiency News*, which starts by recalling that experts estimate that in this country the average thermal efficiency of drying processes is as low as 30 per cent, but that, while paying due regard to economics, this figure can be raised to 60 per cent. This is important, for the extraction of moisture, by one means or another, forms an essential process in many industries.

Over a period the Fuel Efficiency Branch of the Ministry of Fuel and Power has collected information on this subject, and the techniques used have been found to vary widely in quality.

In too many cases the processes are extremely inefficient in their use of heat and power, sometimes even in works which are otherwise most careful in their use of fuel. This may be due to persistence of traditional methods, which could be improved by the application of modern technical knowledge.

Industrial Surveys

Drying will, therefore, clearly repay further investigation in the interests of industry as a whole, and a series of surveys of industrial drying processes has been started.

As a beginning it was decided to examine the drying processes of 26 industries which use the greatest variety of drying methods, namely :—

Agriculture, animal products, brickworks, chemicals, china clay, cocoa and sugar, collieries, colours and pigments, confectionery, dyestuffs, explosives, fermentation, fertilisers, fine chemicals, food products, foundry, laundry and dry cleaning, malting, motor vehicles, paper, plastics, rubber, soap, sugar, textiles, timber.

To complete the work as rapidly as possible, two or three industries have been allocated to each of the Ministry's regions.

Obviously the extensive field-work required can be carried out only with the full co-operation of industry, and this is already in evidence. Experimentally, the views of several industrialists were requested and it was found that they favoured the proposed surveys and recognised that the critical appraisal of accumulated data would be of the utmost value.

The actual investigations at works, with the consent of the firms concerned, will be made by the Ministry's fuel engineers who have already established cordial relationships with industry and trade associations. So far as collieries are concerned, the National Coal Board has itself offered to undertake the survey, and is at present engaged on this. The results will, however, be made available in the same way as results collected by the fuel engineers.

Studies by Experts

As information becomes available, it will be collated and shaped into a balanced report, with the assistance of an editorial group drawn from the Regional Fuel Efficiency Committee. This will ensure that views of industry and of trade associations are fully represented.

A panel of experts in industrial drying has been formed to frame recommendations designed to produce greater efficiency in the use of fuel and of drying operations generally. The members of the panel were chosen to cover as many viewpoints as possible, and to represent manufacturers of drying plant, fuel technologists and important users of various drying processes.

The regional reports will be submitted to the panel, for co-ordination and discussion with representatives of the various industries concerned, in order to decide how the information obtained can best be used to the general advantage.

It would be premature, at the present stage, says *Fuel Efficiency News*, to attempt to forecast precisely the final results which may derive from the investigation. Both the drying requirements and the equipment used vary from industry to industry; but in many cases there may be sufficient similarity between the problems encountered in different industries to render exchange of information between them highly beneficial.

Nevertheless, the interests of each industry will be safeguarded by its trade association, whose consent will be obtained before any information is published.

American Chemical Notebook

(From Our New York Correspondent)

A NEW departure for the packaging and shipment of carbon black in bags has been developed by the Witco Chemical Company, New York, by the use of polyethylene bags secured with a polyethylene cord. The polyethylene sheeting used in producing the bags is 0.003 gauge and the chief advantage claimed for this new method of shipment is that, in preparing the rubber mix, the bag and its contents can be thrown into the Banbury mixer where, at a temperature of 200° C., the polyethylene disintegrates and completely disappears. Thus, the problem of paper bag disposal is eliminated as well as the dusting problem which is encountered in emptying the carbon black from the bag into the mixer. Another advantage claimed is that since bags are waterproof any moisture which may come in contact with them does not affect the carbon black contents, whereas, with paper bags, water permeates through the surface and in many cases contaminates the contents. The polyethylene bags are very light, weighing approximately 3 oz. each. The packaging may be either in 25 lb. or 50 lb. bags, net weight.

* * *

Development of a new chemical, called Du Pont 60 per cent sodium TCA weedkiller, or simply TCA, a salt of trichloroacetic acid, stated to be capable of controlling many noxious grasses which have hitherto resisted the action of various weedkillers, has just been announced by E. I. Du Pont de Nemours & Co., Inc. Expected to have a wide scope of utility, TCA is said to be effective against many important weed pests such as Johnson, Bermuda, and quack grasses, and prickly pear cactus. Important advantages claimed are that it is non-combustible, its period of soil sterility is relatively short, and it can be mixed with 2,4-D and other weedkillers.

* * *

U.S. taxpayers are paying $16,000 per second for America's national investment in atomic energy, according to Mr. Wilbur E. Kelly, manager of the New York Operations Office of the Atomic Energy Commission, who told a special Teachers-Inservice course on atomic energy in New York that by the end of June, 1950, the nation will have invested $4000 million in atomic research. Since September, 1942, daily expenditures for atomic energy had been $1.36 million. These huge expenditures had produced the following results, said the man who helped to design, construct and operate one of the Uranium-235 separation plants at Oak Ridge, Tenn., during the war: Acquisition of the world's only known fissionable materials production plants, the creation of a trained body of scientists, engineers and management people, and accumulation of a great reservoir of scientific knowledge and technical data.

* * *

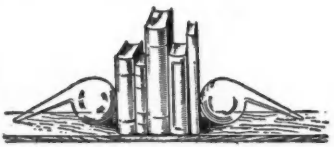
Commemorating the 25th anniversay of the introduction of cellophane, Mr. Crawford H. Greenewalt, president of E. I. Du Pont de Nemours & Company, recently predicted that cellophane production by all producers in 1949 will amount to 300 million lb. He recalled: "When it was introduced, cellophane sold for $2.25 a lb. The present price is 48 cents per lb. for much improved moisture-proof cellophane."

* * *

Mr. Earl W. Bennett, formerly treasurer of the company, and Mr. Leland I. Doan, vice-president since 1938 and secretary since 1941, have been elected chairman of the board and president, respectively, of the Dow Chemical Company, Midland, Michigan, following the death in a plane crash on March 31 of the late Dr. Willard H. Dow. Dr. Mark E. Putnam, a vice-president since 1942, has been appointed general manager. While relinquishing his position of treasurer, Mr. E. W. Bennett will continue in the vice-presidential post to which he was appointed in 1931 and will also retain the important position of chairman of the company's finance committee. (*Page 600 this issue*).

* * *

Recalling that before the war large amounts of American scrap iron were shipped to Japan, Mr. Charles Sawyer, U.S. Secretary of Commerce, recently announced that there were approximately 7 million metric tons of iron and steel scrap available in Japan, "a substantial portion of which could readily be shipped to the U.S.A. A four-man mission that was sent to Japan to survey the situation had found that, contrary to previous reports, there appeared to be large quantities of usable scrap in Japan. Pointing out that U.S. scrap supplies at present were ample, Mr. Sawyer said steel production was still running at capacity rates and there was not an excessive supply in the event of an emergency. As he stated on several occasions, he hoped that some method could be devised for the building up of stocks of high grade steel scrap.



A CHEMIST'S BOOKSHELF

Pulvermetallurgie und Sinterwerkstoffe (Powder Metallurgy and Sintered Materials) by Richard Kieffer and Werner Hotop. Springer-Verlag. Berlin. 1948. Pp. IX + 412. Rm.30.

This book is volume 9 of the series Pure and Applied Metal Science in Separate Manuals, edited by W. Köster. The present second edition of the book was already written at the end of the war, but could not be printed before because of post-war conditions in Germany. The first edition, however, became known abroad from an American reprint. Now, at last, this instructive work by two of the leading contributors to the development of powder metallurgy has become generally available. The contents, compared with the first edition, show little change, but some new developments and recent literature on powder metallurgy have been adopted and a few mistakes eliminated. The chapter which dealt with sintered iron and sintered steel has in the meantime been published in a separate volume. (THE CHEMICAL AGE, *60*, 267/68.)

That the present book represents the comments, observations and work of experts, is demonstrated on every page. All aspects of powder metallurgy are covered and all the important literature on the subject and up-to-date developments are reviewed. The volume is arranged in four parts. The first (60 pages) deals with raw materials, with conceptions and history of powder metallurgy and is a valuable exposition of the underlying theoretical principles. It presents the reasons and motives which lead to the application of metal powders and describes the different processes for their production, their properties and techniques. Part two (95 pages), is an exceptionally able exposition of the scientific fundamentals of powder metallurgy, and describes the properties of the sintered materials and the process of sintering, pressing and hot-treatment. Part three (65 pages), deals with various metals and alloys which are commercially produced by means of sintering, arranged according to their position in the periodic system. Part four (157 pages) deals from the viewpoint of their production properties and historical development with all sintered materials technically used.

Thus, characteristics, preparation and treatment are brought together in one volume and the concluding section is devoted to a survey of the future aims and aspects of powder metallurgy.

Science in Films (1). Edited by Blodwen Lloyd, M.Sc., Ph.D. Sampson Low, Marston & Co. Ltd. 15s.

The ramifications of the film are to-day so extensive—both in the fields of fact and fiction—the development so rapid and the documentation so limited, that to collect and collate information from all parts of the world is a formidable task. That it has been achieved in this book says much for the zeal and capability of the editor. Though parts of the review section are abstruse, and only of specialist interest, there is much to interest the intelligent layman—not least being the reference section comprising half the book.

Dr. Lloyd opens the review with a survey of the use of film in schools, universities, etc. This is followed by a contribution by Roger Shattuck, Film Section Unesco, who discusses the part that film could play in creating a deeper understanding of the place of science in everyday life. The Film and Medicine, Scientific Symbols, and Mathematics, are dealt with by three experts. Three parts of a techniques section complete the review. These are: Ciné-radiography; Technique and Equipment; and Script and Science, each being written by a subject expert. Then follows the Reference Section which supplies information on the film activities of the United Nations and of those of nearly every individual nation.

All sections examine their subjects in great detail; the whole is liberally illustrated by "stills" from many films and the Reference Section is concise and generally informative. It is to be regretted that the precise purpose of many of the films listed has not been made clearer, and it may also be felt that one or two aspects of the scientific film—that on mathematics for example—are not sufficiently important, cinematically, to warrant the space allotted them. But these criticisms do not affect the fact that the book is, in most respects, excellent.

Next Week's Events

MONDAY, APRIL 25

Royal Institute of Chemistry (London and South-Eastern Counties Section). Gillingham: Medway Technical College, Gardiner Street, 7.30 p.m. P. H. Prior: "Some Experiences of a Chemist in the Paper Industry."

TUESDAY, APRIL 26

Institute of Welding. Southsea: Conference of branch officers and spring meeting (until 29th).

Institute of Metals (South Wales Local Section). Swansea: University College, Singleton Park, 6.30 p.m. H. R. Brooker: "Brazing."

British Association of Chemists (East Midlands). Spondon: Moon Hotel, 7.15 p.m. Short lectures by members.

WEDNESDAY, APRIL 27

Manchester Literary and Philosophical Society (Chemical Section). Manchester: Portico Library, Mosley Street, 5.30 p.m. Annual general meeting. Discussion opened by W. A. Silvester.

British Association of Chemists. Birmingham: Chamber of Commerce, 6.30 p.m. Annual section meeting. Liverpool: 7 p.m. Annual section meeting.

Society of Instrument Technology. London: Manson House, Portland Place, W.1, 6.30 p.m. Dr. W. J. Clark: "Telerecording of Thickness, Pressure, Flow and other Physical Quantities Using a Simple Electro-Magnet Circuit."

Institute of Fuel. London: Institution of Mechanical Engineers, Storey's Gate, S.W.1. 10 a.m. and 2 p.m. Second full-day conference on "Combined Heat and Power Supplies," including: F. N. Naylor and H. M. Peacock: "Interchange with the Grid"; L. D. Anscombe and A. J. Ellison: "Technical Aspects of Interchange with the Grid"; Dr. G. E. Foxwell: "Surplus Heat or Power Supplied to Adjoining Works"; H. E. Partridge: "Co-ordinating Heat and Power in a District."

Textile Institute. Preston: Public Hall, Lune Street, 10 a.m. Annual general meeting. Mather lecture: Sir Frederick Bartlett.

The Royal Institution. London: 21 Albemarle Street, W.1. 9 p.m. Sir Lawrence Bragg: "Giant Molecules."

North Western Fuel Luncheon Club. Manchester: Engineers' Club, 12 noon. J. S. Hales: "Domestic Heating, Old and New."

THURSDAY, APRIL 28

The Chemical Society. London: Burlington House, W.1, 7 p.m. Reading of original papers.

Royal Institute of Chemistry (East Midlands). Derby: Annual general meeting. Dr. C. Whitworth: "Some Properties of Explosive Combustion in Gases."

Institute of Fuel. London: Connaught Rooms, Great Queen Street, W.C, 11 a.m. Annual general meeting; 12.30 p.m. reception by the president for annual luncheon.

FRIDAY, APRIL 29

Institution of Chemical Engineers (Graduates' and Students' Section). London: Caxton Hall, Westminster, S.W.1, 6.30 p.m. D. I. W. Atkinson (graduate): "The Mechanism of the Displacement of Liquids from Porous Solids."

Pharmaceutical Society. Manchester: Council Chamber, Houldsworth Hall, 7.45 p.m. Branch and association annual general meeting.

Royal Institute of Chemistry. London: Senate House, University of London, 2.45 p.m. annual general meeting; 8 p.m. reception and conversazione. During day exhibition will be open at R.I.C., 30 Russell Square, W.C.1.

SATURDAY, APRIL 30

Institution of Chemical Engineers (North-Western Branch). Manchester: College of Technology, 3 p.m. C. B. Cox: "An Approach to Continuous Twitchell Fat Splitting."

Royal Institute of Chemistry. London: Annual general meeting: Visits to works and conference during day. Evening: Grosvenor House, W.1, 6.30 p.m. Reception for annual dinner and dance.

Royal Institution Meetings

A new series of evening discourses to be given on Wednesdays, instead of Fridays as previously, is announced by the Royal Institution. Among the speakers and subjects notified are the following:—Sir Lawrence Bragg: "Giant Molecules" (April 27); Prof. E. K. Rideal: "How Crystals Grow" (May 11); Dr. A. H. Cook: "Chromatographic Separation of Natural Compounds" (May 25); Dr. Edwin H. Land, president of the Polaroid Corporation, Cambridge, Massachusetts: "Optical Polarisers" (June 1).

The annual meeting of members will be held on Monday, May 2, at 5 p.m.

Home News Items

New Steel Laboratories.—United Steel Companies, Ltd., is erecting new laboratories at Swindon House, Moorgate Road, Rotherham, Yorks.

Water Rights Granted.—The Ministry of Health has decided to grant the Shell Refining and Marketing Co., Ltd., authority to sink 12 water supply bore-holes at Thornton-le-Moors. The proposal had been opposed by local authorities.

Pyrethrum Flowers.—The Board of Trade, Sundry Material Branch, 8-10 Old Jewry, London, E.C.2, is inviting offers for approximately 65 tons of pyrethrum flowers, substandard grade, for immediate delivery ex store.

Coal Tar Research Station.—The Coal Tar Research Association has leased premises at Gomersal, near Leeds, for its research station. Conversion is proceeding, and it is expected that the move of the headquarters from the present London address, will be made in June, and that the laboratories will be completed later in the year.

Opposition to Light Oil Duty. — The demands for a remission of some of the high tax on light oils (9d. per gal.), which is estimated to cost industrial users nearly £7 million yearly in duty, are to be pressed, with a view to securing an amendment of the Finance Bill. This has been announced in a joint statement on behalf of 13 industrial federations, the English and Scottish NFU, chambers of commerce, aviation and motor manufacturers' organisations.

Stockton Companies' New Factory.—Lease of the new North-East Trading Estates factory, Stockton, has been acquired by the Power-Gas Corporation and Ashmore, Benson, Pease & Co., Ltd. The factory will be specially equipped for production of heat exchangers, industrial fume and dust control and recovery plant, pneumatic conveyors, and general light assembly work in connection with plants for the chemical and gas industries.

Welfare Conditions in Dyestuffs Works.—Mr. Hans Hallmark, who is visiting this country as leader of a party of textile operatives from Sweden, to study working and welfare conditions in British industries, has expressed himself as being most favourably impressed by the excellent organisation they found at the I.C.I. Dyestuffs Division, Huddersfield, where the works council operates on similar lines to those at the firm of Marieholm, Sweden, of which his father is a director.

Houses for Atom Workers.—At the request of the Ministry of Supply, Whitehaven Town Council has agreed to build 170 houses to accommodate workers at the new Government atomic-energy factory at Sellafield.

Oil Blaze.—Exploding oil barrels fed the blaze and hampered firemen when £5000 worth of cooking oil, paint, varnish and turpentine went up in flames in a fire last week at Shaw's, paint manufacturers, oil store in Ravold Street, Greengate, Manchester.

New Bleach Works.—A new bleach works is to be erected in Bury, Lancs., on the site of the 90-year-old Elton Vale Bleachworks, which was totally destroyed by fire seven months ago. A building licence has been granted, and workmen are already engaged upon the foundations. It is expected that full production will begin in about 12 months' time, and meanwhile output will commence immediately the minimum of machinery has been installed.

Grangemouth Oil Activity.—Work is now rapidly progressing at Grangemouth on the site of the major oil and chemical installations planned there. It is estimated that by the end of 1949 the labour force will be houses to a considerable extent on the site, avoiding the daily transportation of some 3000 workers to and from thte site In addition to this, Scottish Oils, Ltd., British Petroleum Chemicals, Ltd., activity, I.C.I., Ltd., is also making very considerable extensions to its Grangemouth plant.

Heat and Power Supplies.—The second full-day conference on combined heat and power supplies, organised by The Institute of Fuel, 18 Devonshire St., London, W.1., will be held at The Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, on Wednesday, April 27, at 10 a.m. and 2 p.m. This will deal with the interlinking of the heat and power systems of adjoining industrial plants, and also with the co-ordination of heat and power supplies and demands throughout a district.

Bonus Scheme.—The directors of E. P. Potter and Co., Ltd., chemical manufacturers, Little Lever, near Bolton, are awarding a production bonus to all employees. For the first month (March) those qualifying for the full bonus (about 72 per cent of the employees) will receive this week (ending April 15) an additional £1 2s. 1d. "If we are able to obtain more labour this amount should be considerably increased," Mr. F. Gore, secretary of the company, told THE CHEMICAL AGE. "We are desperately short of labourers and process workers."

Personal

A ballot is being held by the Society of Chemical Industry to decide which of four nominees shall fill the three vacancies on the committee of the London Section. The four candidates are: DR. H. K. CAMERON, and Messrs. L. M. MIALL, J. F. OLIVER, and P. WEDGWOOD. Ballot forms should be returned to the assistant secretary not later than April 30.

PROF. GILBERT W. ROBINSON, professor of agricultural chemistry at the University College of North Wales at Bangor, returned to Liverpool last week from a four months' tour of South Africa, Australia and New Zealand. He left Wales early in December to head the United Kingdom delegation of the Royal Society to the seventh Pacific Scientific Congress.

MR. R. S. MAYFIELD, formerly with the subsidiary in South Africa of Evans Medical Supplies, Ltd., has been transferred to Singapore and appointed manager for S.E. Asia, in succession to MR. T. H. BENNETT. The latter is shortly taking up another overseas appointment with the company.

MR. R. F. MCNAIR SCOTT has resigned from the chairmanship and from the board of Anglo-Java Rubber and has been succeeded by MR. A. H. DOHERTY, whose resignation from the board of the Central Park Rubber Company was announced last month. MR. P. B. L. COGHLAN is a new director.

MR. H. M. REED, export representative of Mullard Electronic Products, Ltd., left Northolt aerodrome last week on a 15,000-mile trip to the Middle East to investigate market conditions.

PROF. DR. C. BURCKHARDT, at present Swiss Minister in Paris, has been elected a member of the board of Ciba, Ltd., Basle. Dr. Burckhardt has recently expressed his intention to retire from his Paris post.

MR. EDGAR LEWIS, has been elected chairman of the Bristol section of the Royal Institute of Chemistry and also to the Regional Council for Further Education for the South-West Region.

MR. S. ROBERTS, products salesman of the Gas Light & Coke Company, has been appointed products salesman of the North Thames Gas Board.

Redfern's Rubber Works, Ltd., have appointed MR. JOHN DOUGLAS as assistant managing director.

The directors of Sulphide Corporation announce that DR. W. G. HISCOCK has been appointed a director.

Mr. Leland I. Doan, whose appointment to the presidency of the Dow Chemical Co., (U.S.A.) is recorded on page 596

U.S. Award for British Scientist

SIR JOHN SIMONSEN, director of the British Colonial Products Research Council, has been chosen as the first recipient of the American Fritzshe Award instituted "to recognise and encourage outstanding achievement in analysis, research, and new applications of essential oils, essential oil isolates, and related chemicals." The award—a gold medal and £1000—will be presented by the American Chemical Society at its autumn meeting at Atlantic City, N.J.

Obituary

MR. JOHN IRWIN, 68, president of Canadian Oil Companies, Ltd., and of McArthur-Irwin, Ltd., manufacturers of dry colours, etc., died suddenly on a Toronto to Montreal train recently. He was the founder of several chemical and dyestuffs undertakings and president or a director of many other Canadian companies.

Ramsay Memorial Fellowships.—The trustees of the Ramsay Memorial Fellowships for Chemical Research will consider in June applications for Fellowships, one of which will be limited to candidates educated in Glasgow, who can apply to be considered for either Fellowship. The value of each Fellowship will be £400 per annum, normally for two years, to which may be added a grant for expenses of research not exceeding £100 per annum. The joint honorary secretaries of the trust are at University College, London.

Meldola Medal Award

Tribute to Young Doctor's Work

Dr. R. A. Raphael

ON the recommendation of the Council of the Royal Institute of Chemistry, the Society of Maccabaeans has decided to present the Meldola Medal for 1948 to Dr. Ralph Alexander Raphael, in recognition of his contributions—before he was 30—to the investigation of new methods of approach to the synthesis of natural compounds. Educated at Wesley College, Dublin, Dr. Raphael entered the Imperial College of Science and Technology with a Royal scholarship and the University of London scholarship in chemistry.

In his post-graduate work he came under the direction of Sir Ian Heilbron and Prof. E. H. R. Jones. As a result of his pioneer work on the properties and reactions of acetylenic compounds, he was awarded the degree of Ph.D. (1943) of the University of London, and the diploma of the Imperial College.

Further investigations by Dr. Raphael resulted in 1947 in the total synthesis of the natural antibiotic, penicillic acid, which conclusively established its structure. His attention was then devoted to the utilisation of the peculiar properties of acetylenic compounds to accomplish the synthesis of carbohydrates and their derivatives, and, up to the present, arabitol, rebitol, erythritol, threitol, and erthrulose have been obtained. Methods of producing long chain aliphatic acids of various types have also been receiving the doctor's attention.

He was recently appointed lecturer in organic chemistry at Glasgow University.

The Royal Institute of Chemistry has invited Dr. Raphael to deliver a lecture on some aspect of his work, and the Meldola Medal will be presented to him on that occasion.

Indian Research

Far-reaching Programme Planned

A NUMBER of new schemes and continuance of investigations on a wide range of subjects were sanctioned by the governing body at a meeting of the Board of Scientific and Industrial Research held in New Delhi in February.

Among the recommendations were the construction of an osmometer for high polymer research, survey of fungus flora as sources of antibiotics, and the setting up of plant-scale organisations for low temperature carbonisation of coal at the Fuel Research Institute, Dhanbad.

Particular attention was given to the manufacture of optical glass in India. The Glass & Refractories Research Committee's scheme that pilot-plant work should be taken up without delay at the Council's Central Glass & Ceramic Research Institute, Calcutta, was adopted. It was also recommended that the various ceramic and glass industrial centres should be visited by a team of experts, who should report to the Government of India any steps they considered necessary for the scientific development and improvement of the industry.

NATIONALISATION

SPEAKING at the annual meeting, this week, of the United Kingdom Provident Institution, of which he is chairman, Sir Ernest Benn (the chief proprietor of THE CHEMICAL AGE) said that new insurance accepted in 1948 exceeded £5 million, although premiums had been raised, and the results of the first three months of this year had surpassed every previous record in new business.

He recalled that, in answer to a recent Parliamentary question whether he would introduce legislation to nationalise the insurance industry, the Prime Minister had said " No Sir " and thus confirmed a similar statement made in November 1945.

The public, recommended Sir Ernest Benn, should understand that life assurance could be destroyed, but could not be nationalised. A railway or a coal mine might function more or less as before, but a policy of assurance dependent upon future political opinion would be something entirely different from a contract based on the solid savings of the past. The State could only substitute the hope that future generations would be willing to pay. The security which it was their institution's business to provide for the benefit of members, was, in fact, very different from a scheme which would place everybody's eggs in the one big basket of the State.

Overseas News Items

Soap Production in India.—The starting of a soap factory at Calicut was recently announced by H. Sitarama Reddi, Minister of Industries in the Madras assembly. It was proposed to carry out extensions for production on more economical lines.

Lower U.S. Sulphur Production.—Production of sulphur in U.S.A. in January was 416,678 long tons according to the U.S. Bureau of Mines. This was 21,849 long tons less than December 1948, but 10,910 long tons better than the monthly average for recent years. The stock position improved, producers holding 3,274,313 long tons—an increase of 49,299 long tons during the month.

New Oxygen Plant.—The Dominion Oxygen Company, Ltd., a unit of Union Carbide & Carbon Corporation, has put into operation its new oxygen and acetylene plant at Arvida, Quebec. This plant will serve the requirements of all industry in the Lake St. John district. The plant augments existing plants of Dominion Oxygen at Montreal, Shawinigan Falls, Quebec, Toronto, Meritton, Welland, Sault Ste. Marie, Winnipeg, Saskatoon and Vancouver.

French Penicillin Centre.—As a result of agitation following the announcement that the Centre de la Penicilline—the French national centre of penicillin distribution—was to be closed on March 31, action has been postponed. It has been suggested that the centre may be transferred to the National Blood Transfusion Centre at Montrouge, but the solution is not regarded as satisfactory since the present centre has many fixed installations which it would be impossible to dismantle. To abandon them would be to lose millions of francs. A final decision has yet to be announced.

U.S. Tinplate Export Quota.—Following consultation with the Tinplate Industry Advisory Committee, an export quota of 100,000 net tons of tinplate, to be supported by priority ratings and shipped during the third quarter of 1949, has been established by the U.S. Department of Commerce's Office of International Trade. The rated quota set for the third quarter is 13,000 tons below that of the second quarter and the cut is said to represent the Department's policy of reducing all mandatory programmes as rapidly as conditions permit. Rated export orders for tinplate are licensed only for preservation of perishable foodstuffs for consumption abroad. Additional quantities of tinplate, up to 45,500 tons, may be licensed for export in the third quarter, but will not be rated.

Japanese Record for DDT.—December 1948 was the fourth consecutive month in which Japanese production records for DDT concentrate were exceeded. The output of 49 metric tons was 22 per cent greater than the November total. Manufacture in December was carried on by six companies, one of which produced DDT for the first time.

Nuclear Physics in Australia.—Prof. Marcus Oliphant, the atomic scientist, now at Birmingham University, will return to Australia in 1951, as director of the research school of physical sciences, Canberra. He is seeking to recruit research workers and technicians to help design and build a modern laboratory for research in fundamental nuclear physics.

Italian Dextrose Research.—Under the direction of Professors Sorgato and Massa, the Institute of Industrial Chemistry at the University of Padua, has been conducting research on crystallographic features of various modifications of dextrose, crystallisation of anhydrous alpha-dextrose directly in water solutions. The claim to have obtained homogenous, well developed and extremely pure crystals, starting from high purity solutions. Such solutions are optically empty; methods hitherto in use could not avoid the formation of macro-molecules of dextrose.

Longest-Burning Electric Lamp?—What is believed to be the world's longest-burning electric lamp has just been announced by the (U.S.) General Electric Company's Lamp Department at Cleveland, Ohio. A tiny neon glow lamp, which engineers say will produce a small amount of light for more than 25,000 hours or nearly three years—it is used in household appliances, switchboards, radios and in other electric equipment to indicate that current is "on" or "off." Designated the NE-2, the miniature lamp consumes only one twenty-fifth of a watt of electric current.

"Steel Shortage Ended."—The so-called "steel shortage" in the U.S.A. has disappeared and steel supply no longer is a problem to most consumers, according to Mr. Walter S. Tower, president of the American Iron and Steel Institute. Record-breaking steel production in the post-war period in the United States was made possible, he said, largely by steel companies' expenditures of two billion dollars for expansion and plant improvement. When all current expansion and improvement was completed, some 100 million tons of steel ingots could be produced annually.

Parliamentary Topics

Home Lead Prices.—Little satisfaction was given last week to questions addressed to the Minister of Supply (Mr. G. R. Strauss) about the discrepancy between foreign prices and Ministry prices for lead. Replying to Mr. Hugh Fraser, who contrasted the home price of £106 per ton for virgin lead with the £82, which he said was charged in the U.S.A., the Minister said it would be contrary to established practice to disclose contract prices paid by the Ministry. Considerable freight charges had to be paid. It was the Government's object to keep the price reasonably stable over as long a period as possible.

Barium Sulphate.—In reply to Col. J. R. H. Hutchison, who asked whether, in view of the demands for British production of barium sulphate in connection with nuclear fission protection and for other purposes, the President of the Board of Trade would take steps to co-ordinate the requirements of the Ministry of Supply, the Ministry of Works and the Board of Trade, with any other interested Ministries for this commodity. Mr. J. Edwards (Parliamentary Secretary) said supplies of barium sulphate, mainly from home sources, were sufficient to meet all requirements. It was possible, however, that the co-ordination of specifications for special Government needs would facilitate processing of the material, and the point was being pursued with the other Government departments concerned.

Reduced Chemicals Prices

The price of acetone has been reduced, with effect from April 4, by £7 to £8 per ton (according to quantity), the schedule now ranging from £70 per ton for 45-gallon lots to £67 per ton for 50 tons taken over a year. This reduction is the second to be made in the last 15 months, a total drop of over 20 per cent having now occurred since the beginning of 1948. In consequence, the price of diacetone alcohol has also been reduced, with effect from April 11, by £14 to £15 per ton and now stands at £111 to £113 per ton. British Industrial Solvents, Ltd., advises that it has also decreased, with effect from April 4, by £4 per ton the price of certain low-boiling solvents. The price of dioctyl phthalate has fallen by 4¾d. per lb. to 2s. 6½d. —2s. 5d. per lb., with effect from April 14.

Cold Protective Film

New Strippable Protective Medium

AN improved protective film which is applied cold by brushing or spraying has been developed in the laboratories of Clear Glass Products, Ltd., Southampton.

Departure from the limitations of the hot melt dipping process gives the new product —Avigel 100—a very wide scope. Beside protecting metals against most forms of corrosion it makes an effective strippable protective medium for glass, ceramics, plastics, etc. Brushed or sprayed—the material dries rapidly leaving a tough, non-flammable film which can be handled in less than 10 minutes. The film which can be easily peeled off, gives protection against water, oxidation, mineral acids and alkalis and a wide range of solvents, oils, and greases, etc.

S. AFRICAN IMPORT CONTROL

A DIRECTOR of a South African firm of manufacturers' representatives holding a large number of British, Canadian and American agencies states that an immediate effect of import control has been that some merchants have been able to off-load goods to other merchants at prices very much higher than would have been possible a week before the introduction of the restrictions. In spite of import control, local industries are expected to import a considerable quantity of chemicals in the current year.

The extraction of common salt from sea water by means of evaporation in specially constructed open-air pans is the first step now being carried out by the Vrany Chemical Corporation, Saldanha Bay, Cape Province. This company was formed early in 1948, and it is expected that in the immediate future its products will come on to the market.

Teaseed Oil Imports.—The Board of Trade has announced that an open general licence for the import of teaseed oil consigned from China and Hong Kong has been granted. Individual licences ceased from April 20.

Wool Wax Alcohols.—Bulk quantities are now available of water-soluble polyoxyethylene condensation products of wool wax alcohols—non-ionic surface active agents consisting of mixed polyoxyethylene glycol ethers of cholesterol, lanosterol and straight chain alcohols. Croda, Ltd., announcing this, states that the polar portion of the molecules of these products will be largely due to the sterols, steroids and triterpine alcohols condensed with the alkylene oxide, as distinct from straight chains of the higher aliphatic alcohol ethers previously available.

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

PEST CONTROL (UNITED KINGDOM), LTD. (formerly PEST CONTROL, LTD.), Bourn (Cambs.). (M., 23/4/49). February 9, debenture, to Hambros Bank, Ltd., securing all moneys due or to become due to the Bank from Pest Control, Ltd., or Pest Control (United Kingdom), Ltd., or any subsidiary company of Pest Control, Ltd., or Pest Control (United Kingdom), Ltd.; charged on properties specified in rider to debenture and a general charge. Note.—The sums secured by this debenture shall be deemed to include £260,000 (for which this debenture is *pro tanto* a substituted security) being the principal amount outstanding at the date of the debenture under a mortgage dated September 10, 1942, made between Pest Control, Ltd. (now known as Pest Control (United Kingdom), Ltd.) and Midland Bank, Ltd., and seven further mortgages supplemental thereto and made beween the same parties, the benefit of all of which mortgages was transferred to Hambros Bank, Ltd., by transfer of mortgage dated January 24, 1949. *£218,364. January 14, 1949.

PEST CONTROL, LTD. (formerly PEST CONTROL HOLDINGS, LTD.), Bourn (Cambs.). (M., 23/4/49.) February 9, debenture to Hambros Bank, Ltd., securing all moneys due or to become due to the Bank by Pest Control, Ltd., or Pest Control (United Kingdom), Ltd., or any subsidiary company of Pest Control, Ltd., or Pest Control (United Kingdom), Ltd.; charged on property, etc., described in rider to particulars and a general charge. Note.—The sums secured by this debenture shall be deemed to include £260,000 to which reference is made above (for which this debenture is *pro tanto* a substituted security) being the principal amount outstanding at the date of the debenture under a mortgage dated September 10, 1942, made between Pest Control, Ltd. (now known as Pest Control (United Kingdom), Ltd.), and Midland Bank, Ltd., and seven further mortgages between the same parties supplemental thereto, the benefit of all of which mortgages was transferred to Hambros Bank, Ltd., by a transfer of mortgage dated January 24, 1949.

Satisfaction

INTERNATIONAL OPTICAL CO., LTD., Pontypridd. (M.S., 23/4/49.) Satisfaction March 10, of debenture registered June 25, 1941.

New Companies Registered

Clifford & Nealon, Ltd. (467,010). Private company. Capital £500. Manufacturing chemists, etc. Directors: Kathleen R. Nealon, B.Sc., and C. S. Whyte. Solicitors: Wingfield, Halse & Trustram, 209 Kilburn High Road, N.W.6.

Colour and Synthetic Dyes, Ltd. (467,081). Private company. Capital £500. Manufacturers of oils, paints, pigments, etc. Solicitors: Herbert Smith & Co., 62 London Wall, E.C.2.

G. Turner (Biggleswade), Ltd. (467,025). Private company. Capital £5000. Manufacturing chemists, etc. Directors: Mrs. N. Smith, C. J. Smith, A. H. C. Crick. Reg. office: 63 High Street, Biggleswade.

Chemical and Allied Stocks and Shares

MARKETS since the Easter holiday have been slightly more active, but buyers have continued to show considerable caution as regards industrial shares. The latter are still subject to dividend limitation, and in the absence of any important tax reliefs and with growing competition both overseas and at home, the outlook is obscure. In the circumstances it is not surprising that British Funds have been favoured as a safety-first refuge for investment money until the outlook can be more clearly assessed.

Sentiment in the gilt-edged market has continued to be helped by the view that British Gas stock will be made longer-dated than other nationalisation stocks. Although the exchange into gas stock will mean a considerable loss of income for many shareholders in gas companies, it is not generally expected that there will be any big switching from gas stock into higher-yielding securities. The tendency may be to follow a waiting attitude until the market outlook is clearer.

Pending the dividend, which will be announced by the time these notes are in print, Imperial Chemical have strengthened

to 45s. 7½d. Although the final dividend is payable on larger capital, the market confidently anticipates the total payment for the year to be maintained at 10 per cent. Profits are expected to show a further upward trend, although at this stage they can hardly reflect full benefits from the increased capital.

Helped by the full results and the annual report, which give an extensive review of the company's activities, Monsanto Chemical 5s. shares have been firm at 56s. 10½d. Fisons changed hands around 50s., William Blythe shares have been firm at 21s. 3d., awaiting the financial results, Albright & Wilson were 30s. 6d., Bowmans Chemical 4s. shares 6s., while Brotherton 10s. shares at 20s. 6d. remained 6d. over the level at which dealings recently started.

Burt, Boulton & Haywood have kept steady at 27s. 6d., and United Molasses at 45s. 3d. have held most of their recent advance, and now yield rather less than 4¾ per cent. The 4s. units of the Distillers Co. changed hands slightly over 27s., British Plaster Board 5s. shares were 22s. 9d., and Turner & Newall 77s. 9d.

Awaiting the results, which may be delayed a little because of the inclusion this time of consolidated accounts, Associated Cement shares at 81s. 9d. were again higher on balance; the market is continuing to talk of an increased dividend. General Refractories, at 24s. 6d. remained firm on further consideration of the past year's 12½ per cent dividend, on which basis these 10s. shares yield fully 5 per cent.

Glaxo Laboratories have been active on the possibility of an eventual bonus, but at £22 failed to hold best prices. Although the bonus tax is removed, there will be no rush of bonus distributions, particularly as all capital increases still have to receive the sanction of the Capital Issues Committee.

Movements in iron and steel shares have been small. Staveley were firm around 83s. 9d., Dorman Long were 32s. 6d., and United Steel 29s. 7½d. Guest Keen showed firmness at 48s. on the exemption from nationalisation obtained by another of the company's subsidiaries.

Boots Drug at 53s. 3d. lost part of an earlier rise, Sangers were 33s. 1½d., Beechams deferred were 16s., and British Glues & Chemicals 4s. shares changed hands around 18s. Shares of companies with plastics interests turned easier, British Xylonite coming back to 96s. 10½d. at one time, and Kleemann 1s. shares to 16s. 3d., while De La Rue were 36s. 6d. Oils moved narrowly, with Anglo-Iranian easier at £8 and Shell at 63s. 9d.

British Chemical Prices

Market Reports

ACTIVITY on the general chemicals market has been on the quiet side, due mainly to the short holiday week and the curtailment of contract deliveries to many of the consuming industries. Inquiries for new business have been on a satisfactory scale and a steady flow of orders for shipment is being accepted. Prices generally are unchanged and firm, although a further reduction in some of the non-ferrous metal compounds would not be surprising in view of the reduced quotations for lead and zinc. Chlorate of soda continues active with available supplies in strong request. Apart from pitch and crude tar, the coal tar products market continues quiet.

MANCHESTER.—The pressure for supplies of chemical products on the Manchester market during the past week has been noticeably easier, although this was due entirely to the holiday stoppages at consuming works, and an immediate revival of the demand for textile bleaching, dyeing and finished chemicals was reported when operations were resumed. The immediate outlook for both home and export business in chemicals and allied products is regarded as satisfactory. Most descriptions of fertilisers are meeting with a brisk demand and manufacturers of superphosphates and the compound manures, in particular, are experiencing difficulty in keeping pace with current needs.

GLASGOW.—The turnover in the chemical market during the past week has been on a reduced scale. This is the normal occurrence during the holiday period in Scotland, and the average turnover is not likely to be regained for two or three weeks. There have been no outstanding demands and no noteworthy price changes. The export market has also been a little quieter, although still fairly active. A number of orders have been booked.

Synthetic Materials Exhibition.—An exhibition of synthetic materials for housing and other purposes was opened in the Technical College, Dundee, last week by Mr. R. Gardner-Medwin, chief architect and planning officer, Department of Health for Scotland. There are examples of synthetic boards, plastic laminates, plywoods with veneer metals and boards made from waste products, all of which testify to the amount of research and design being devoted to new materials.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Sulphurised terpene products and oils containing the same.—E. I. Du Pont de Nemours & Co. March 2, 1945. 618,245.

Method of producing iron powder.—G. Malecki. March 21, 1946. 617,975.

Cast refractory products.—Corning Glass Works. April 10, 1945. 618,248.

Low-temperature olefinic polymers.—J. C. Arnold. March 29, 1946. 618,249.

Cation-exchange resins.—Permutit Co., Ltd., and T. R. E. Kressman. April 4, 1946. 618,251.

Oxidation of sulphur dioxide to sulphur trioxide.—I.C.I., Ltd., F. R. Himsworth, and B. Symington. April 11, 1946. 617,979.

Method of ensuring the safety of tanks containing liquefied gases.—Compagnie Française de Raffinage. May 18, 1942. 618,254.

Process for purifying nitriles.—A. Abbey. (Armour & Co.) May 17, 1946. 617,980.

Extraction of copper and other metals.—O. Jestrabek. June 27, 1946. 618,262.

Compounding, mixing, and sheeting of plastic materials.—J. Ferguson & Sons, Ltd., and S. A. Ede. July 4, 1946. 617,985.

Process for the manufacture of phosphorus oxychloride.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny & Cirey. Aug. 16, 1944. 617,990.

Synthesis of hydrocarbons.—C. Arnold. (Standard Oil Development Co.) July 29, 1946. 618,068.

Welding rods.—Mond Nickel Co., Ltd. Aug. 3, 1945. 618,069.

Process for the production of N-arylthiazolinium quarternary salts and of dyes therefrom and for the incorporation of N-arylthiazolinium dyes in photographic emulsions.—Kodak, Ltd. Oct. 16, 1945. 618,073.

Cooling or degassing plant.—Holst & Co., Ltd., and L. G. Wills. Oct. 10, 1946. 618,285.

Azo dyestuffs.—I.C.I., Ltd., and M. Mendoza. Oct. 14, 1946. 618,007.

Making products of powdered iron or iron alloys.—N. E. Brooks. (Isthmian Metals, Inc.) Oct. 14, 1946. 618,293.

Heat treatment of duplex iron and steel bodies.—N. E. Brooks. (Isthmian Metals, Inc.) Oct. 14, 1946. 618,009.

Rotary cutter for use in preparing ring test pieces of rubber and similar materials.—I.C.I., Ltd., J. M. Buist, and R. L. Kennedy. Oct. 14, 1946. 618,008.

Process for increasing the rate of polymerisation of diallyl phthalate.—N.V. de Bataafsche Petroleum Maatschappij. Nov. 5, 1945. 618,295.

Soldering or annealing of palladium and its alloys.—Mond Nickel Co., Ltd. Oct. 13, 1945. 618,020.

Method of concentrating synthetic latex.—B. F. Goodrich Co. June 18, 1943. 618,299.

Shrinking of cellulose derivative textile materials.—D. Finlayson, and A. W. M. Cooke. Oct. 15, 1946. 618,025.

Process and device for contacting liquids with gases.—N.V. de Bataafsche Petroleum Maatschappij. Nov. 9, 1945. 618,029.

Filters or strainers for liquids.—Glenfield & Kennedy, Ltd., and I. L. Boucher. Oct. 15, 1946. 618,316.

Manufacture of basically substituted 9 : 10-dihydroanthracene derivatives, and their salts and amido-oxides.—R. M. Hughes. (J. R. Geigy, A.G.) Oct. 16, 1946. 618,034.

Manufacture of imidazolines.—Ciba, Ltd. Nov. 2, 1945. 618,039.

Electrodeposition of nickel on nickel.—Mond Nickel Co., Ltd. Oct. 25, 1945. 618,322.

Resistance or spot welding electrodes.—Mallory Metallurgical Products, Ltd. Oct. 26, 1945. 618,082.

Stretched artificial yarns and textile materials made therefrom.—D. Finlayson, and F. B. Hill. Oct. 17, 1946. 618,085.

Impregnating and adhesive compositions.—I.C.I., Ltd., and T. J. B. Arthur. Oct. 18, 1946. 618,093.

Plastic compositions containing glass fibres.—E. I. Du Pont de Nemours & Co. Oct. 19, 1945. 618,093.

Production of fibrous material.—Fibreglass, Ltd., A. de Dani, and R. G. Terrell. Oct. 21, 1946. 618,108.

Method for pickling, polishing and brightening metals and alloys.—Compagnie de Produits Chimiques et Électrometallurgiques Alais, Froges & Camargue. Sept. 18, 1946. 618,120.

Method of securing adhesion between polyethylene and other materials.—C. E. Richards, R. L. Bull, and H. F. Wilson. Oct. 23, 1946. 618,345.

Moulding of synthetic resin sheets.—I.C.I., Ltd., and R. A. Kinnear. Oct. 23, 1946. 618,124.

Preparation of organoboron compounds.—British Thomson-Houston Co., Ltd. Oct. 25, 1945. 618,358.

Gas filters.—S. Morel. Oct. 30, 1945. 618,148.

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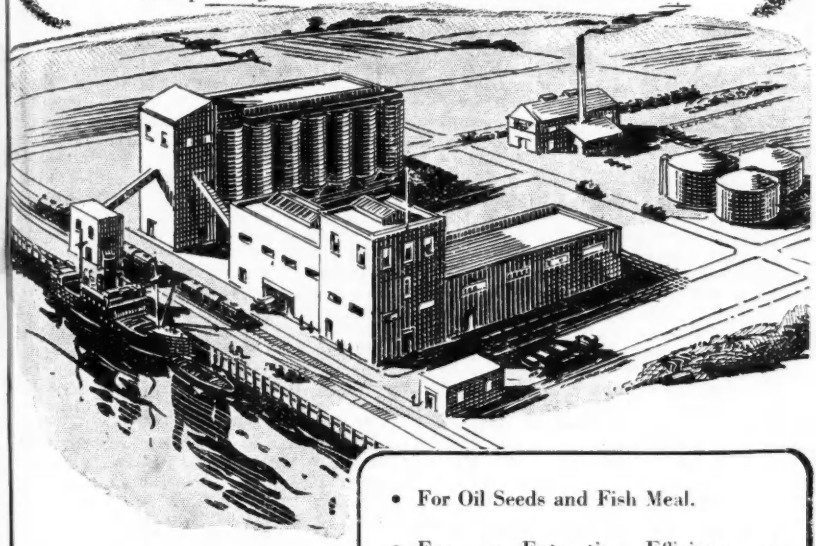

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Gaseous fluid filters.—S. Morel. Oct. 30, 1945. 618,359.

Heat-exchange apparatus.—W. K. Porteous. Oct. 26, 1946. 618,150.

Cementing together the surfaces of shaped carbon bodies.—C.U.R.A. Patents, Ltd., J. H. McKee, and M. Pirani. Oct. 28, 1946. 618,367.

Manufacture of coagulants for rubber latex and the coagulation of rubber latex therewith.—D. Outon-Powell. Oct. 29, 1946. 618,375.

Coated electrodes for arc welding.—Welding Supplies, Ltd. Oct. 31, 1945. 618,304.

Polymerisation of compounds containing the ethylenic double band.—I.C.I., Ltd., I. Marshall, and K. B. Jarrett. Oct. 30, 1946. 618,168.

Production of polyvinyl amine compounds.—Kodak, Ltd. Oct. 30, 1945. 618,175.

Production of fibrous heat insulating materials.—British Celanese, Ltd. Jan. 23, 1946. 618,178.

Balances.—Chemical Engineers' Consultants, Ltd., and G. Edwards. Oct. 30, 1946. 618,183.

Dehydrohalogenation processes.—Shell Refining & Marketing Co., Ltd., R. S. Airs, and P. J. Garner. Oct. 31, 1946. 618,189.

Bearing alloys.—Mond Nickel Co., Ltd. Nov. 1, 1945. 618,386.

Solutions or dispersions of linear super polyamides and the treatment of fibrous materials therewith.—Tootal Broadhurst Lee Co., Ltd., R. P. Foulds, and W. H. Roscoe. Nov. 1, 1946. 618,195.

Shaping cellular products made of artificial resins.—Dunlop Rubber Co., Ltd., and M. Gordon. Nov. 1, 1946. 618,197.

Sulphur containing dicarboxylic acids and method of preparing same.—B. F. Goodrich Co. Nov. 28, 1945. 618,390.

Anodising of aluminium or aluminium base alloys.—Humber, Ltd., and S. C. Clifford. Nov. 1, 1946. 618,202.

Dust collectors.—J. Howden & Co., Ltd., and L. Lee. Nov. 4, 1946. 618,210, 618,211.

Method of making a monaryl-dihalosilane.—Dow Chemical Co. Oct. 4, 1945. 618,403.

Manufacture of alumina hydrosols.—J. C. Arnold. (Standard Oil Development Co.) Nov. 25, 1946. 618,313.

Processes of producing plant extracts and the products resulting therefrom.—Regents of the University of Minnesota. March 6, 1943. 618,406.

Making solutions of cellulosic material.—S. M. Edelstein. Dec. 13, 1943. 618,584.

Preservation of oleaginous materials from oxidative rancidity.—Regents of the University of Minnesota. March 13, 1943. 618,409.

Methods of producing dibasic acids.—A. H. Stevens. (Emery Industries, Inc.) Feb. 28, 1945. 618,412.

Methods for producing penicillin.—A. J. Moyer. April 8, 1944. 618,415, 618,416.

Catalytic polymerisation of hydrocarbons.—Phillips Petroleum Co. March 23, 1942. 618,674.

Manufacture of amino-amine soaps.—T. Swan & Co., Ltd. March 9, 1943. 618,767.

Distillation method.—Compagnie Française de Raffinage. July 13, 1944. 618,419.

Preparation of amino acids and intermediates therefor.—Merck & Co., Inc. Nov. 10, 1944. 618,591.

Gas purification process.—Koppers Co., Inc. Aug. 17, 1944. 618,507.

Hard-surfacing electrodes.—Soc. le Carbone-Lorraine. March 10, 1945. 618,429.

Method of forming halogenated organic compounds and the products resulting therefrom.—J. Hyman. July 25, 1945. 618,432.

Sterilising detergent compositions.—Industrial & Commercial Detergents, Ltd., and J. C. L. Resuggan. March 28, 1946. 618,433.

Apparatus for mixing and extruding plastic materials.—Soc. P. A. Lavorazioni Materie Plastiche. Sept. 18, 1942. 618,518.

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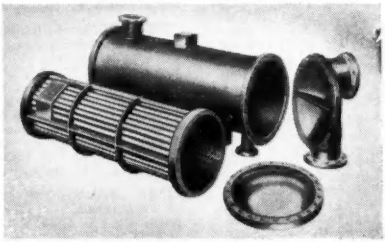

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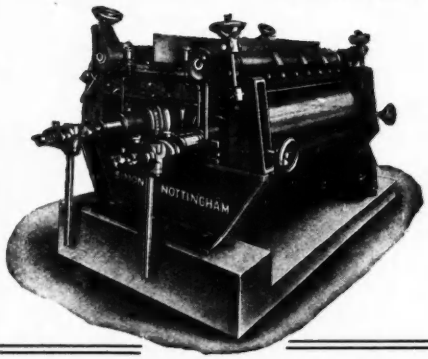

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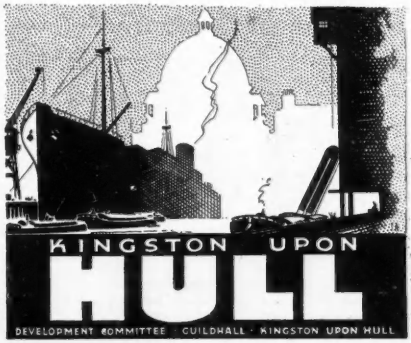

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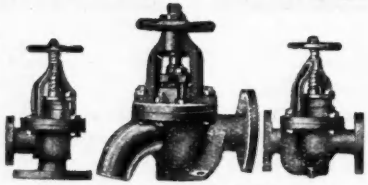

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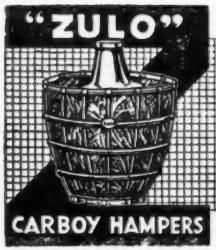

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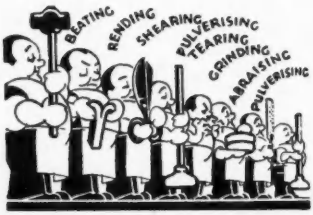

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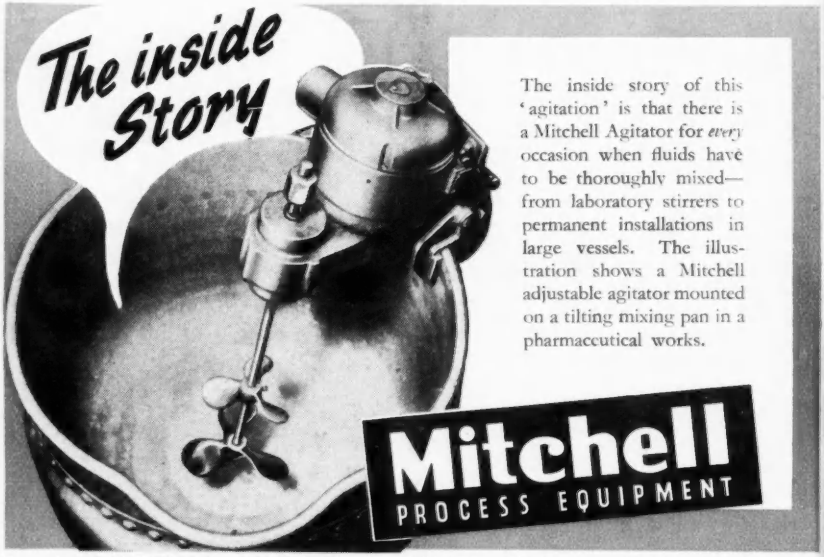
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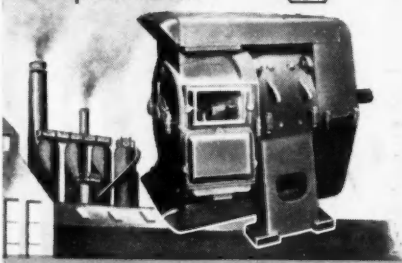

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